A slow order for Los Angeles Metrorail?

August 1984

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The magic of microprocessors

Conrail, Crane and Change in the '80s

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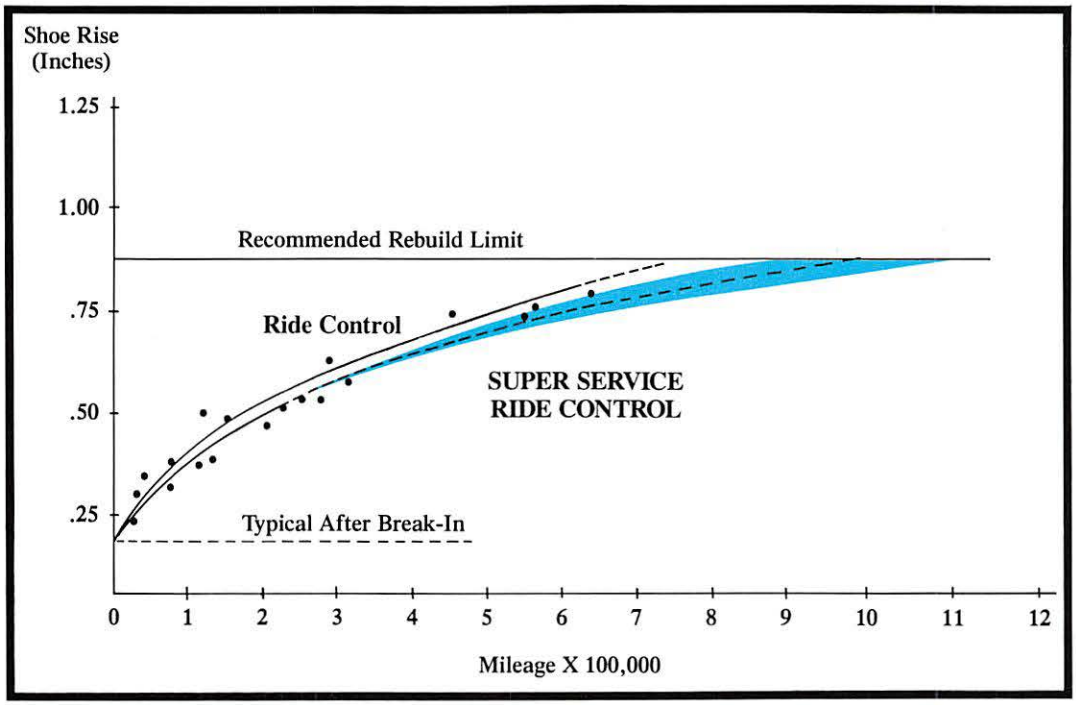

There's more to the graph than meets the eye. Those dots represent almost 4000 data points. Data points that measure wear on the *total* control system including the expensive-to-repair bolster slope. Almost 2000 carsets of Super Service are in high mileage service. Extrapolating from the miles traveled so far, we believe the Super Service may go a million miles to the Ride Control's already impressive 600,000 to 800,000 miles.

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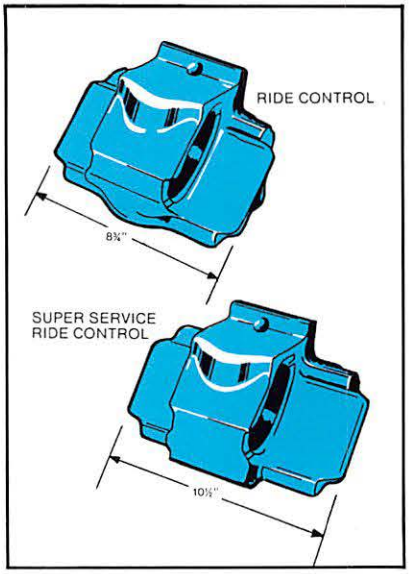

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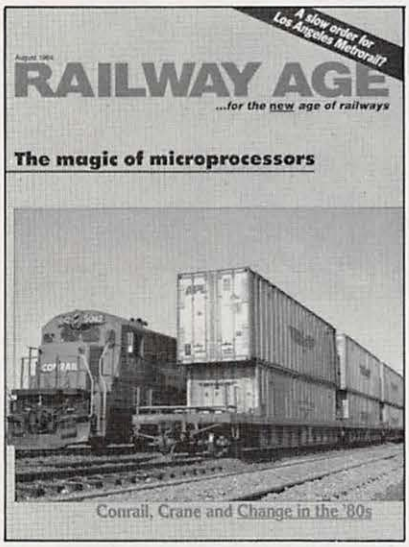
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Cover: APL double-stack container cars on Conrail. Photo by Roy Blanchard. *Page 33.*

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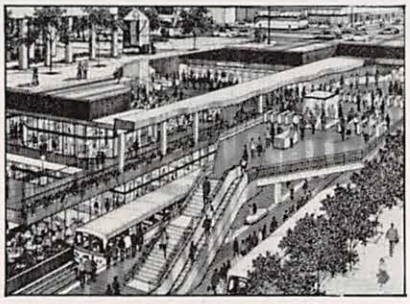

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L. Stanley Crane has presided over the railroad turnaround of the century—but he's far from complacent, seeing productivity as the next big challenge.

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The microprocessor era holds exciting possibilities for the railroads—not the least of which is a modular, industry-wide-compatible Advanced Train Control System.

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After trimming 2,000 miles of line, and investing $1 billion in what remains, ICG is close to its goal of becoming a sleek expressway between Chicago and the Gulf.

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At North Little Rock, Ark., MP has built a $40-million locomotive facility designed to meet the expanding needs of Union Pacific System into the next century.

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A moment Los Angeles has worked toward for 30 years—ground-breaking for a subway—will be delayed as federal funding problems are tackled.

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Inside

The Conrail/Crane factor

LUTHER S. MILLER

Wall Street regards L. Stanley Crane as something of a wizard—a management Merlin who transformed a red-ink property into a coveted blue chip. His fellow railroaders know Crane as a shrewd and tough manager who runs his business well because he makes it his business to know every aspect of it. Crane sees himself, he told *Railway Age* the other day, as "just a nuts and bolts railroader." If he has any ability as a manager, he said, it has come from his good fortune in finding the right people at the right place at the right time—which (he added) is just what he found at Conrail. "The job of the chief executive officer," said Crane, "is to wave his hands when he sees something going wrong, get someone pointed in the right direction, and then get out of his way and let him do it."

When *Railway Age* asked Crane to address the broad question of "Change in the '80s"—the subject of a year-long series in this magazine—he protested that he was "not really very good at that kind of highfalutin' talk."

But in a taped exchange with the editor and the publisher of *Railway Age,* Conrail's chairman and CEO came across not only as a nuts and bolts railroader (with a particular passion for good track, well and inexpensively maintained) but as a man singularly well equipped to comment on some of the more "highfalutin" aspects of the changing railroad scene—among them, politics and productivity. A transcript of the interview starts on p. 33.

Showtime—in Boston, Chicago, Washington

The transportation business is booming, and the carriers—freight and passenger—are in a buying mood. So it's no surprise that suppliers have been signing up in record numbers for four major equipment shows that will take place in the next couple of months. First on tap (Aug. 19-22) are exhibits of the Railway System Suppliers, which are being mounted in connection with the AAR's C&S Division meeting in Boston. In July, RSS had already exceeded its goal of 110 sold exhibit spaces. Another sellout, by all early indications, will be RAILEXPO '84, which the Railway Supply Association will stage in Chicago (Sept. 22-26) concurrently with meetings of the Coordinated Associations. That will be followed by the American Public Transit Association's International Transit Expo '84 in Washington (Sept. 30-Oct. 4), which will be overlapped by exhibits that U.S. and foreign suppliers will put together for the Pan American Railway Congress in Arlington, Va. (Oct. 3-9).

Railway Age will be present at all of these, with extra copies of the August and September issues, respectively, available for convention delegates.

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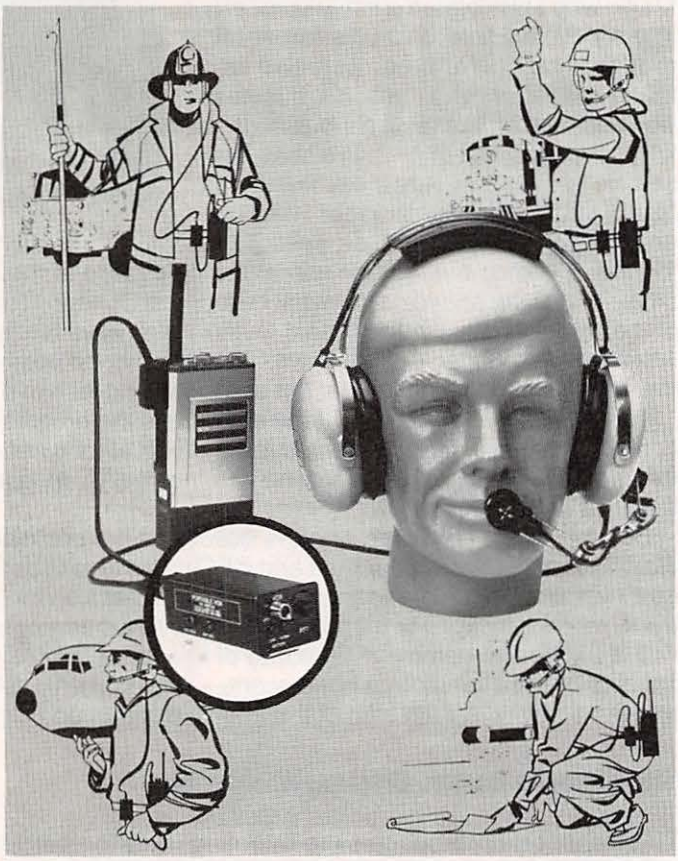

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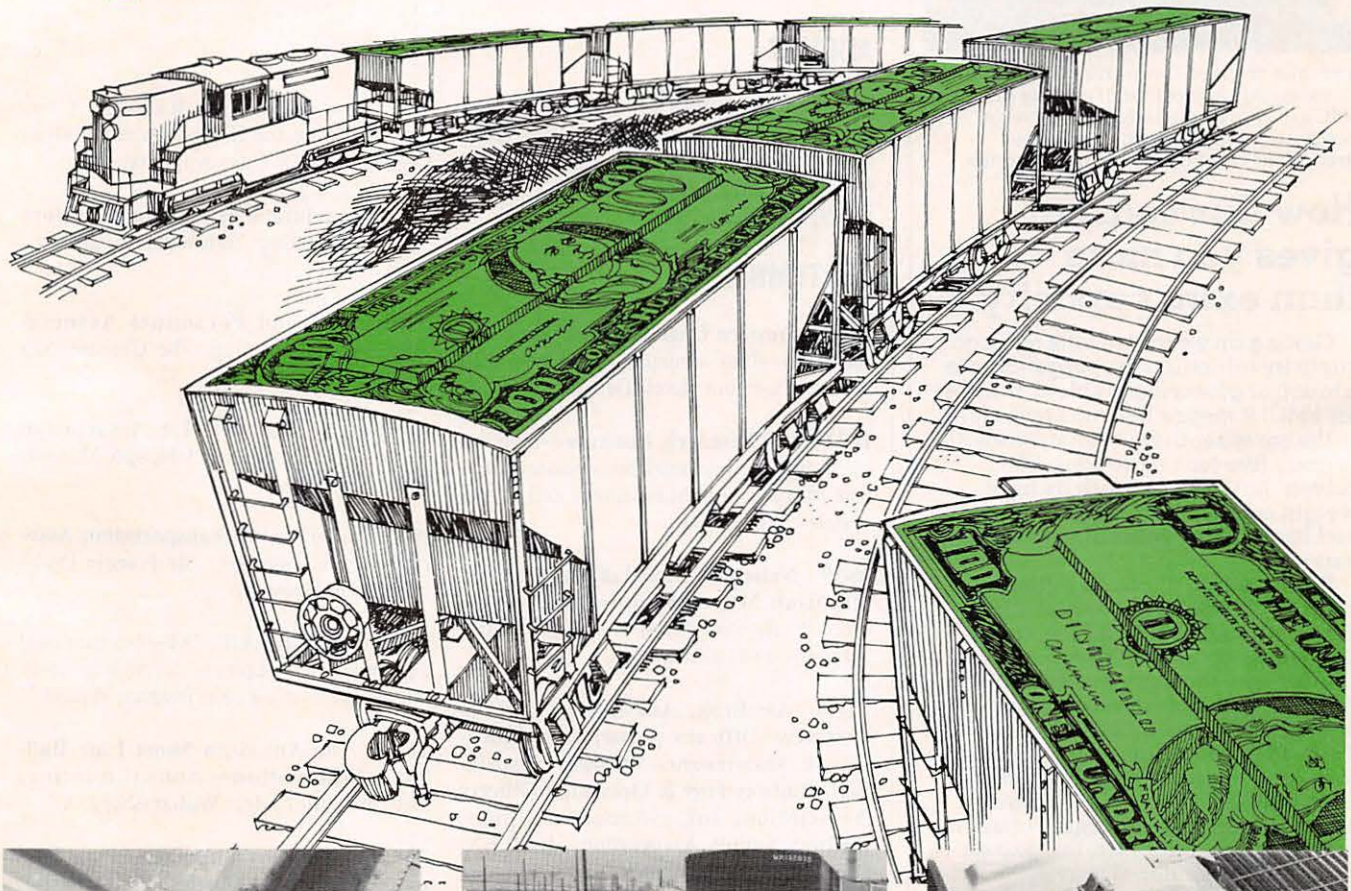

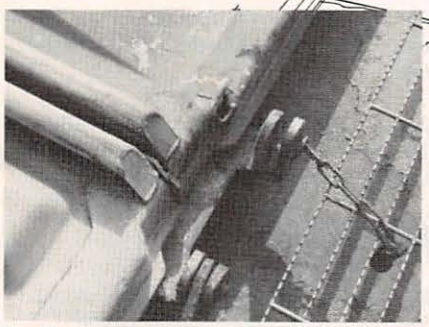

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Duralatch assemblies are made from a steel-reinforced, high molecular weight polymer. They're lightweight, yet incredibly strong. They won't rust and require no lubrication. They provide a considerable weight reduction over steel battens. And they treat your hatch covers very, very gently.

Best of all, they can quickly pay for themselves through reduced repairs and replacement—plus savings in downtime, labor and cargo damage.

Use your own figures to determine potential savings. Call or write today for a Duralatch "Cost Justification Analysis" form. Contact: Dayco Corporation, Railroad Products Division, 333 West First Street, Dayton, Ohio 45402. 513/226-5863.

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A unique dropped center sill contributes to an extremely low center of gravity in FMC's 105 ton coal gondola. This car is designed for high capacity with the strength necessary for unit-train service.

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Contact us for your free copy of our Technical Bulletin that shows how FMC coal cars are built better: Vice President of Sales, FMC Corporation, Marine and Rail Equipment Division, 4700 NW Front Avenue, Portland, Oregon 97208; (503) 228-9281.

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Meetings

AUGUST

19-22 Association of American Railroads—Communication and Signal Division—Annual meeting; **Railway Systems Suppliers, Inc.**—Annual meetings and exhibits; Park Plaza; Boston.

SEPTEMBER

10-13 Western Coal Transportation Association—10th annual meeting and conference; Fairmont Hotel; Denver.

11-13 IIT Research Institute—Seminar on design of overhead transmission lines and railroad communications and signal systems; Atlanta, Ga.

16-19 National Council of Physical Distribution Management—Annual conference: *Beyond 1984. . .*; Dallas Convention Center, Dallas, Tex.

22-26 Air Brake Association, Car Department Officers Association, Locomotive Maintenance Officers Association, Railway Fuel & Operating Officers Association, Inc.—Annual meetings; **Railway Supply Association**—RAILEXPO '84 Exhibit; Conrad Hilton; Chicago.

24-26 American Railway Bridge & Building Association, Roadmasters and Maintenance of Way Association of America/Railway Engineering-Maintenance Suppliers Association, Inc.—Annual conference; Palmer House; Chicago.

24-26 K&E International—World of Shipping Show; The Rivergate; New Orleans.

27 Railway Progress Institute—Second Annual High-Speed Rail Conference; Hyatt Regency Crystal City; Arlington, Va.

27 National Association of Purchasing Management, Rail Industry Group—Semi-annual meeting; Chicago.

30-Oct. 4 American Public Transit Association—Annual meeting; Washington Hilton; Washington, D.C.

OCTOBER

1-3 American Public Transit Association—International Public Transit Expo '84; Washington (D.C.) Convention Center.

3-9 Pan American Railway Congress—Indoor and outdoor exhibits; Hyatt Regency Crystal City; Arlington, Va.

2-5 Association of Railroad Editors—Annual meeting; Yarrow Hotel; Park City, Utah.

8-10 Railroad Personnel Association—Annual meeting; The Cloister; Sea Island, Ga.

10-12 The Railway Tie Association—Meeting; Downtown Chicago Marriott Hotel; Chicago.

10-12 Intermodal Transportation Association—Fall meeting; Sir Francis Drake Hotel; San Francisco.

16-20 INTERRAIL '84—International exhibition of equipment for rolling stock maintenance and repair; Poznan, Poland.

21-24 The American Short Line Railroad Association—Annual meeting; Williamsburg Lodge; Williamsburg, Va.

22-24 Transportation Research Forum—25th Annual Meeting; Parker House; Boston.

24-26 American Council of Railway Women—Annual meeting; Ritz-Carlton-Buckhead Hotel; Atlanta, Ga.

NOVEMBER

8 Railway Progress Institute—Annual Meeting and Dinner; Conrad Hilton; Chicago.

13-15 Coal Technology '84—7th International Coal and Lignite Utilization Exhibition & Conference; Astrohall, Houston.

14-16 National Industrial Transportation League—Annual Meeting; Biltmore Hotel; Los Angeles.

26-29 National Association of Regulatory Utility Commissioners—Annual Convention; The Westin Bonaventure; Los Angeles.

DECEMBER

4-6 K&E International—World of Shipping Show; Tacoma Dome; Tacoma, Wash.

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CubicTransitNews

Miami Metro Opens With America's Newest Fare System

MIAMI — America's newest elevated rail rapid transit system opened here May 20 and its automated fare collection system handled more than 100,000 opening day passengers "without a glitch", according to a Miami METRORAIL spokesman. Passengers used magnetically encoded fare passes to ride the trains, passing through the latest generation of fare gates built by Cubic Western Data. In addition to the passes, the gates also accept coins and magnetically encoded bus-to-rail transfers.

Thousands of commuters ride the trains each day, and the spokesman for the Metro-Dade Transportation Administration called the fare collection system one of the "shining points of the transportation system."

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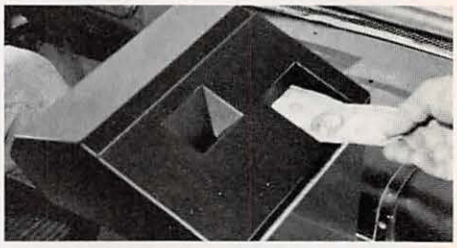
SAN DIEGO — Cubic's automatic fare collection systems can improve any transit system's bottom line. Rail systems, bus systems, intermodal systems — all can benefit from Cubic's advanced fare collection technology. And we're committed to finding solutions that not only meet today's needs but tomorrow's as well.

For innovative solutions to fare collection problems, backed by long-term support only America's fare collection leader can provide, contact: Cubic Western Data, 5650 Kearny Mesa Road, San Diego, California 92111. Telex(I): 68-31138. Or call direct: (619) 268-3100.

Los Angeles Buses To Get New Cubic Fareboxes

LOS ANGELES — The Southern California Rapid Transit District has approved testing of a new computerized automatic fare collection system manufactured by Cubic Western Data.



When tests are completed, SCRTD expects to install the new fareboxes on more than 900 buses systemwide.

Cubic's Fast Fare System farebox for SCRTD accepts coins and dollar bills. Drivers can see the fares through viewing windows as they are deposited. At the same time a digital display tallies the fares and shows the exact amount paid.

Other transit authorities have expressed interest in the new farebox which is also available in models that accept magnetically encoded passes, tickets and transfers.

Cubic Wins Mass. Turnpike Toll Collection Contract

BOSTON — The Massachusetts Turnpike Authority has awarded Cubic Western Data an $8.2 million contract to design and produce a new computerized toll collection system.

Cubic will build, test and install automated toll collection systems along 134 miles of the turnpike, replacing present worn-out and obsolete equipment.

In operation, vehicle drivers will take a magnetically encoded card from a dispenser or agent as they enter the highway. When exiting at their destination the card will be given to a toll road attendant who will then pass it through a special reader. The amount due which is based on distance traveled is displayed and funds collected.

Cubic was awarded the contract as a result of technical and price competition over one French and three American competitors.

U.S. Firm To Supply Singapore AFC System

SINGAPORE — Cubic Western Data, America's only automatic fare collection company, has been selected over French and Japanese competitors to build the $23 million AFC system for the Singapore Mass Rapid Transit. The American firm will design, produce and install over 1,000 major pieces of the fare collection system at Singapore's 42 MRT stations.

Work will begin immediately on the Cubic AFC system that consists of passenger-operated ticket vending machines, agent-operated ticket office machines, automatic passenger gates, station computers, a system central computer, ticket encoding and sorting equipment, and other supporting equipment.

Cubic is the only American firm to win a mechanical and electrical contract on the MRT. Earlier, Cubic was the only American company to provide equipment for Hong Kong's Mass Transit Railway.

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Market Indicators

Key economic indicators of railroad traffic, 1983-1985E(a)

	1983	1984E 1st QtrR	1984E 2nd Qtr	1984E 3rd Qtr	1984E 4th Qtr	1984E Year	1985E 1st Qtr	1985E 2nd Qtr	1985E 3rd Qtr	1985E 4th Qtr	1985E Year
Gross National Product, billions Constant (1972) dollars	1,535.3	1,606.0	1,618.0	1,638.0	1,657.0	1,630.0	1,675.0	1,686.0	1,702.0	1,713.0	1,694.0
% increase											
Year-over-year	3.4%	7.8%	6.1%	5.4%	5.4%	6.2%	4.3%	4.2%	3.9%	3.4%	3.9%
From previous quarter		8.8	3.0	5.1	4.5	—	4.5	3.0	3.8	2.7	—
Industrial Production Index (1967 = 100)	147.6	159.8	164.0	166.0	168.0	164.0	170.0	172.0	174.0	175.0	173.0
% increase											
Year-over-year	6.4%	15.4%	13.5%	9.4%	8.0%	11.1%	6.4%	4.9%	4.8%	4.2%	5.5%
From previous quarter		11.1	10.5	4.9	4.8	—	4.8	4.7	4.7	2.3	—
Auto sales, million units sold in United States	9.2	10.6	10.2	10.5	11.1	10.6	10.6	10.4	11.0	11.2	10.8
% increase											
Year-over-year	15.5%	26.2%	10.9%	12.9%	12.1%	15.2%	—	2.0%	4.8%	0.9%	1.9%
From previous quarter		28.3	(15.1)	11.8	22.9	—	(18.0)	(7.5)	23.1	7.3	—
Housing starts (private), millions	1.70	1.96	1.90	1.80	1.80	1.87	1.70	1.60	1.70	1.70	1.68
% increase											
Year-over-year	60.4%	19.5%	12.4%	1.1%	5.9%	9.5%	(13.3)%	(15.8)%	(5.6)%	(5.6)%	(10.2)%
From previous quarter		61.2	(12.2)	(21.1)	—	—	(22.2)	(23.5)	25.0	—	—
Corporate profits											
% increase											
Year-over-year	13.5%	37.2%	17.9%	13.1%	18.3%	20.7%	18.5%	20.7%	14.7%	14.8%	16.5%

(a)As forecast by the Goldman Sachs Economic Research Group. All data is seasonally adjusted and growth rates for successive quarters are seasonally-adjusted annual rates of change.
R-Reported

Source: Goldman Sachs Research

Revenue freight carloadings

Commodity	July 14 week	% change from 1983	July 7 week	% change from 1983	June 30 week	% change from 1983	June 23 week	% change from 1983
Grain	28,794	(4.4)	24,469	(11.9)	27,225	13.9	24,767	(2.2)
Other farm products	3,475	(25.0)	3,359	(11.9)	3,763	(13.6)	3,744	(8.1)
Metallic ores	18,613	(11.7)	17,007	(11.8)	18,029	(18.4)	20,569	(7.7)
Coal	112,976	21.6	85,494	38.6	112,418	46.7	125,966	20.0
Crushed stone, gravel and sand	12,706	12.3	11,230	27.8	13,586	25.8	12,642	13.4
Nonmetallic minerals	13,271	15.7	11,238	16.1	12,414	8.5	11,823	0.1
Grain mill products	9,772	(12.9)	8,871	(7.5)	10,108	(9.6)	10,270	(10.2)
Food and kindred products	10,626	(5.4)	9,262	0.7	11,257	(2.0)	11,184	1.1
Primary forest products	13,452	(10.4)	9,504	(7.2)	14,044	6.3	14,129	(1.2)
Lumber and wood products (except furniture)	6,753	(3.6)	4,991	1.9	7,815	(2.7)	7,424	(4.3)
Pulp, paper and allied products	13,959	(1.9)	13,137	11.5	15,516	2.0	15,181	(2.9)
Chemicals and allied products	23,056	9.6	19,812	12.9	24,014	3.6	23,332	8.2
Petroleum products	4,870	4.4	4,093	4.8	4,842	0.7	4,945	3.0
Stone, clay and glass products	11,531	(0.2)	10,157	6.9	11,941	13.3	11,522	8.5
Coke	5,344	(7.3)	5,327	6.0	5,402	(5.1)	5,375	(0.7)
Metals and products	8,834	13.6	7,803	30.6	10,557	17.5	9,888	24.5
Motor vehicles and equipment	15,830	9.2	13,819	19.3	19,024	11.9	21,007	15.2
Waste and scrap materials	8,919	10.8	6,967	20.3	9,655	25.5	10,107	23.0
Forwarder and shipper assn. traffic	7,003	(8.7)	6,167	(5.4)	7,805	(10.1)	7,182	(13.9)
All other carloads	55,584	14.3	50,555	24.9	60,938	14.1	58,207	12.3
LCL traffic	164	(23.0)	182	(11.7)	217	(22.8)	221	(25.1)
Total Cars Loaded	**385,532**	**7.1**	**323,444**	**14.2**	**400,570**	**14.9**	**409,485**	**8.6**

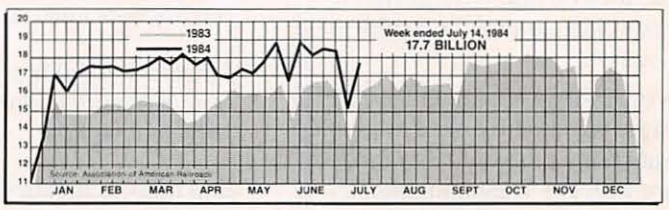
Estimated revenue ton-miles (billions)	1984	1983	% change from 1983
28 weeks	495.9	428.8	15.6

Piggyback loadings

Week ended	Cars loaded 1984	% increase from 1983	Trailers/ containers 1984	% increase from 1983
June 16	50,426	8.4	88,486	9.7
June 23	52,104	10.9	87,578	6.7
June 30	53,831	11.6	93,842	12.3
July 7	44,757	20.9	73,941	16.0
Cumulative total,				
27 weeks	1,359,084	17.2	2,342,275	17.1

Rail freight traffic trends

Billion ton miles (Estimated)



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Watching Washington

Where are the satisfied customers?

The specter of railroad nationalization haunted the halls of Congress in the late 1970s. It was a determination on the part of Congress to have no more Penn Centrals, no more Rock Islands, no more massive government bailouts, that led to passage of the Staggers Rail Act in the summer of 1980.

For the railroads, Staggers has so far worked just as it was intended to work. While they still fall short of what the ICC has determined to be revenue adequacy (their rate of return for the 12 months ended March 31 was less than 5%), they are on the road to recovery.

The question now before the House (and the Senate) is not how well the railroads have fared—indeed, many legislators seem to have forgotten what led to Staggers in the first place—but what has happened to shippers.

What *has* happened to the shipping community under Staggers?

If all you know is what you read in the papers—and if you have been reading about recent efforts in Congress to pull the teeth out of Staggers—you have every reason to believe that the railroads have prospered only at their customers' expense.

A joint resolution sought by Senator John Danforth (R.-Mo.) asks the ICC to refigure the thresholds for revenue adequancy and market dominance. Senator Nancy Kassebaum (R.-Kan.) wants full disclosure of the terms of railroad-shipper contracts. Legislation proposed by Senator Dennis DeConcini (D.-Ariz.) and Rep. John Seiberling (D.-Ohio) would sharply reduce Staggers Act maximum rate provisions. The list could—and doubtless will—go on.

The reading public may be forgiven if it concludes that a great wave of shipper discontent is rising in the land.

Are there no satisfied customers out there—are there no shippers who have benefited from Staggers?

The answer is, of course, yes, the great majority of them—though their voice comes through only faintly in the din created by those powerful few, led by electric utility and coal interests, who want to go back to the "good old days" (good for them, at least) of regulation.

For starters, try Detroit

Railway Age recently asked a number of shippers across the nation—none of them, admittedly, in the utility or coal businesses; they have had their say—if deregulation had been more helpful than hurtful. The verdict of those who responded was unanimous: Deregulation has helped. Their reservations were relatively minor, involving the closing of gateways and the cancellation of joint rates by certain railroads; none wanted the wrenching changes sought in bills now before Congress.

Listen to the three big auto-makers, whose transportation bills affect the prices of consumer products more than those of any other single industry:

Chrysler Corp., which uses rail for 30% to 35% of its inbound shipments and 60% of its outbound traffic (about 75,000 vehicle carloads), says both rates and service have improved as a result of contracts the company has entered into with the railroads. The only change Chrysler wants to see is "any action that will accelerate deregulation."

"Helpful" is also the word from General Motors, which pays out around $1.5 billion a year for rail transportation. "We have entered into contracts with all major U.S. railroads," says GM. "Rates and service levels have been favorably affected." All that GM now wants is "modifications to insure competition between railroads."

Ford Motor Co., which has an annual transportation bill of over $1 billion and ships 55% of its freight by rail, says, "The vigorous competition between railroads which has been generated by deregulation has thus far had an overall positive impact....Ford has entered into numerous rail contracts with various carriers. Although the terms of those contracts vary, they basically guarantee Ford either rate reductions, improved service levels, or both in change for our long-term commitment of traffic." Ford does voice concern over "actions taken by some railroads to reduce competition through cancellation of joint rates, routes and reciprocal shipping agreements."

The same concern is expressed by George C. Bush, general manager-traffic for the Jones & Laughlin Steel Corp., but he says: "Generally, deregulation has been helpful. Prior to deregulation, several railroads participated in a given movement. With the promulgation of contracts, one carrier ends up moving all the traffic under a winner-take-all concept. With contracts, service has improved and rates have been reduced on competitive traffic." J&L spends $500 million a year on freight transportation; railroads handle most large-volume inbound shipments and 30% to 35% of outbound shipments. "The rail percentage is increasing as marketing becomes more aggressive," says Bush.

Bill Kinsella, corporate traffic manager of the Johns-Manville Corp., which pays out $150 million a year for transportation, says "deregulation has been most helpful," with contracts reducing rates and providing some service improvements. J&L uses rail for 80% of inbound and 40% of outbound shipments, some 28,000 carloadings a year. The Staggers amendments recommended by Kinsella are again of the non-convulsive variety, having to do with reciprocal switching and closing of gateways.

One shipper with no reservations is Lou Bonner, vice president of physical distribution for the Adolph Coors Co., who says deregulation has been "very good" for Coors. The Colorado-based brewer has a $100-million-a-year freight bill. Prior to deregulation about 60% of Coors freight moved by rail; that is now up to 80%—some 50,000 carloads—and continues to increase. "Coors has entered into several hundred railroad contracts which assure equipment supply and in many cases lower through rates," says Bonner.

Is anybody out there listening?

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Lines on Labor

Memo to unions: Don't misread those dollar signs

As the television sportscasters so often put it when (or because) they can't think of anything else to say, "No doubt about it." In this case, no doubt about what? No doubt about the activation of the salivary glands that followed the announcement of what railroads had brought down to the bottom line in the first quarter of 1984. Among union negotiators and among those rail customers who want repeal (or at least major revision) of the Staggers Act, no doubt about it, the juices began flowing. And if these folks were merely salivating after the first quarter, they may be positively drooling as the second-quarter results come in.

GUS WELTY

Railroads are on a roll (as the sportscasters also like to say, in describing anybody who has won two in a row).

But, are railroads really on a "roll"? Hardly. To keep on with the sports analogy until you're thoroughly bored with it, railroads are a lot like the Chicago Cubs: The perennial loser suddenly starts winning, crowds of 40,000 start showing up for games, everybody forgets the days when the Cubs couldn't draw as many fans as you could get with a watch-the-paint-dry contest—and everybody also forgets that r-o-l-l are the first four letters in roller-coaster.

The facts are these. Railroads are in fact finally making some money, thanks to deregulation, mergers and productivity improvements, the last credited in part to labor but credited mostly to the huge capital investments made during the 1970s and early '80s. Railroads, many of them, are now making decent return-on-investment numbers, but those numbers are still far under the cost-of-capital numbers for the most-recent 12-month period. And even if the ROI numbers go higher, about all a reasonable person could say is, "Well, it's about time"—when you consider that rate-of-return never got as high as a miserable 3% during all of the '70s. Railroads ain't rich, not when you stack them up against public utilities or manufacturing companies. Railroads ain't rich, not when you consider the continuing and perhaps increasing needs for heavy capital investment in plant and equipment.

Then, there is another factor, one that both labor and shippers should sit back and ponder before they go charging into bargaining or into Congress with demands that the railroads (1) open up the treasury, and (2) submit to a load of re-regulation.

Railroad earnings are, in a word, fragile. Railroads are terribly at the mercy of economic fluctuations, whether those fluctuations have to do with the demand for grain or for automobiles or for electrical energy or for whatever. What this means, however you look at it, is that railroads have to have some cushion, built up during the good times, to withstand the kick-in-the-pants they're going to get when the bad times come, as inevitably they will.

Some shippers believe that, since deregulation, they've been raped. But if you look at what was happening before dereg and at what's happening since, in a number of cases there might have to be some question as to who's done what to whom.

There are also some in rail labor who think that they've been had. But they have an even harder-to-prove case. Wages and benefits among railroad employees are among the best to be found anywhere in industry, and especially in the surface transportation industry. Honest rail labor leaders won't deny this. But at the same time, these same leaders don't seem at all inclined to open up the pay-rules, work-rules work-practices situation to the point where railroads are better able to compete with thier main competition, the motor carrier—the motor carrier who is non-union and the motor carrier who has been granted concessions by the Teamsters organization.

Living in the past can be dangerous to your health

So many rail labor rules and practices are, simply, archaic. The 100-mile day, when you can make a "day" in a couple of hours on a road train? The multi-person crew, when the technology exists under which a train can run with zero crew members? The remaining road/yard restrictions, when the principal competition isn't blocked by such barriers? The caboose, when the technology exists to make it obsolete and the sociology indicates that it might be better to have crew-togetherness? Come on.

It's been said before, but it should be said again and again, as often as it takes to drive the point home: The transportation market is a finite one which will grow only slowly. Therefore, the best hope for any carrier, any mode, lies in increasing market share. And the best hope for increasing market share lies in reducing costs and in improving productivity.

What's happened, since deregulation, is that the Teamsters have seen the light, conceding points right and left in order to help trucking companies make it. Airline unions have perhaps gone even farther in recognizing the threat to their jobs if they insisted on maintaining the status quo.

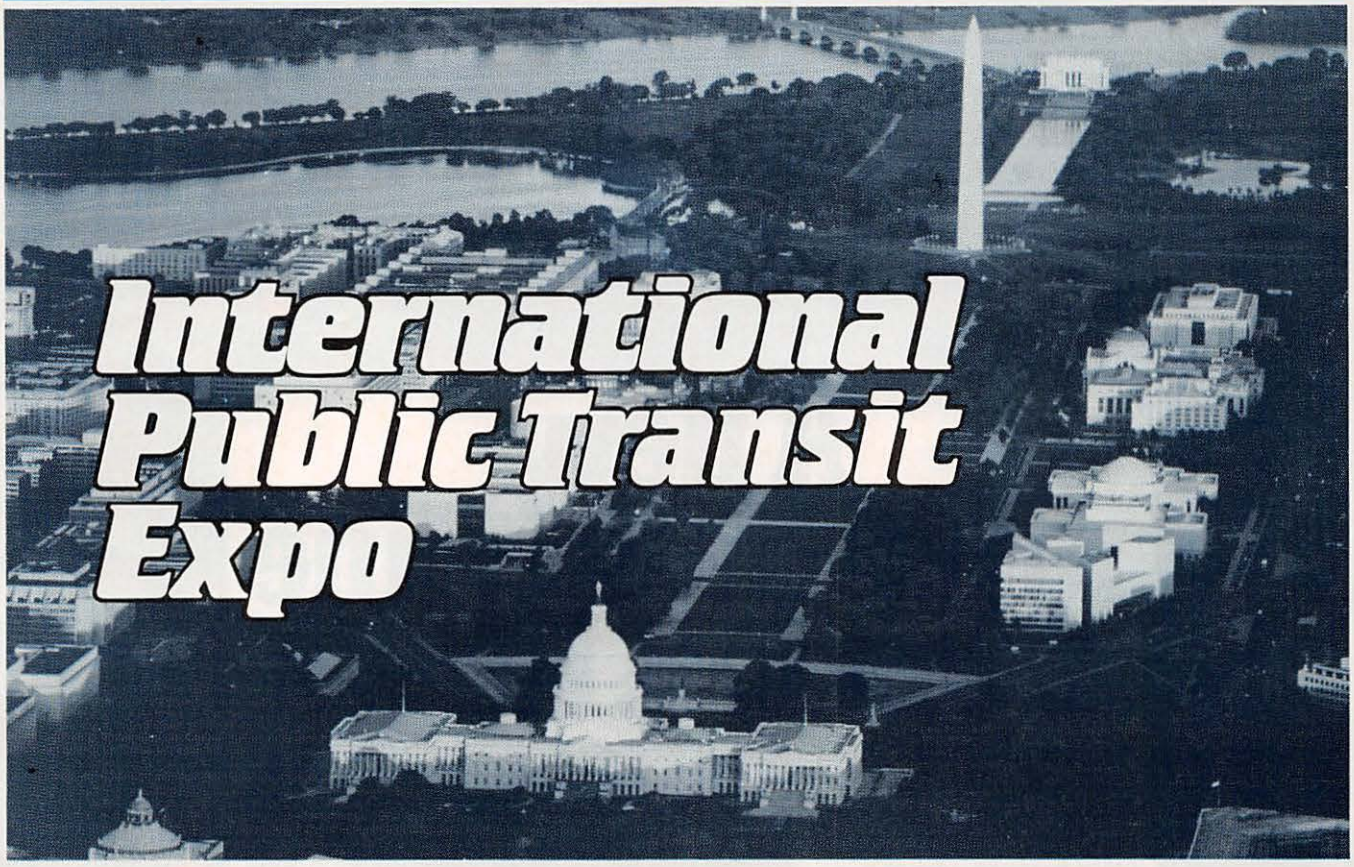
Rail unions have been the exception. Since dereg, the only "concession" has been the caboose-off agreement signed by the United Transportation Union; it was signed under duress, and UTU is now trying to get it wiped off the books.

Somewhere, something is wrong.

Surely, you say, labor organizations and the employees they represent can't believe that railroads are unique, impervious to competition, able to go on doing what they've been doing without regard to what's been happening in the real world of competition.

Don't bet the farm. Labor has yet to show that it can respond to change as brilliantly and even as diplomatically as management has.

No doubt about it.



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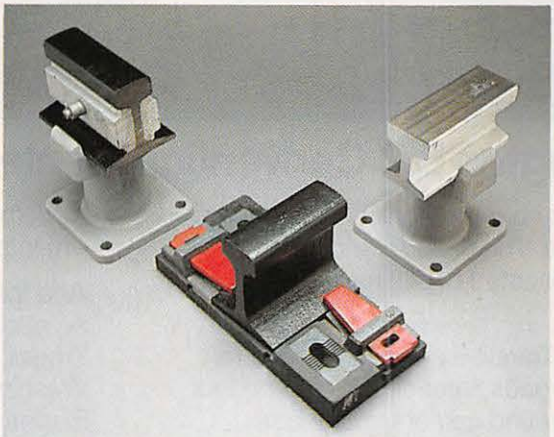

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Update

MCI acquires new fiber optic routes

As routes for fiber optic cable, railroad rights-of-way continue to attract telecommunications companies. Significantly raising the amount of roadway already spoken for (*RA*, June, p. 22), MCI recently added 3,000 miles to its previously-announced base of 4,300 under lease from various railroads.

Claiming the largest such involvement so far, MCI added Union Pacific, Milwaukee Road, Boston & Maine, and Illinois Central Gulf to a roster already including CSX roads and Amtrak. "By the end of 1984, we'll have about 900 miles of fiber cable in the ground and operating," says MCI.

The company won't reveal financial terms, but its deal with the Milwaukee is valued at $688,000 for 77.85 miles of right-of-way between Chicago and Milwaukee. According to documents filed with the bankruptcy court in Chicago, the primary term is 25 years, ending March 31, 2009.

The deal involves a non-exclusive license, but with other licenses or occupational rights to be subordinated to MCI's rights. An additional non-monetary consideration, the documents say, is that MCI will "provide, install and maintain at no cost to the trustee, and dedicated to his exclusive use, the capacity of two fibers full-time and one metallic pair (order wire) with associated facilities including repeaters and interface equipment to provide standard CCITT transmission with alarm and diagnostic capabilities between the trustee's communication control centers in Milwaukee and Chicago."

Along ICG, MCI will lay 375 miles of cable to link Chicago with East St. Louis, and New Orleans with Baton Rouge. Along the B&M, the company will install 300 miles to complete a system also using CSX/Amtrak routes. And on UP, the plan is for 2,300 miles in five states.

UP announced June 29 that it had also reached agreements with AT&T Communications, LDX Net, Inc., and United States Telecom Communications, Inc. Involving perpetual easements, the agreements cover 6,700 miles (including MCI routes) in 13 states.

As a result, UP plans to expand its own use of fiber optics. "We see this technology as a compatible use of our right-of-way that promises both immediate and longer-term economic benefits for our companies," says John C. Kenefick, Union Pacific System chairman.

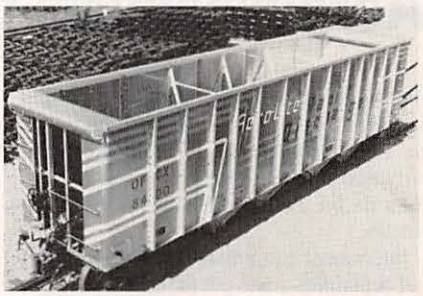
Unit trains for Chinese coal?

Canadian Pacific Consulting Services Ltd. (CPCS) has won a $1.6 million contract to study the feasibility of establishing unit-coal train service in China, between the coal-producing province of Shanxi and the port of Quinhuangdao, a distance of about 400 miles.

Shanxi currently produces about 54 million tons of coal annually (more than the entire country of Canada produces, according to CPCS), and by the year 2000 that figure is expected to top 74 million tons. Most of the coal is for domestic consumption; it moves by rail to the coast, and by ships and barges to coastal regions.

China is expanding its rail capacity to meet this increasing coal production. It recently received a $220 million World Bank loan for this purpose (*RA*, May, p. 32). Earlier this year, a delegation of Chinese officials visited China to study coal transportation. "They saw CP Rail's coal unit trains loading at the Fording Goal mine at Elkford, B.C., and unloading at Roberts Bank," said Bob Ballantyne, vice president of CPCS. "They were impressed by the Canadian technology."

The feasibility study that CPCS will conduct for China should be completed by the end of February 1985. Following that will be Phase II, which will include detailed engineering, project management, and purchase of equipment outside China; and Phase III, to involve commissioning of facilities, assistance with technical training, and initial management of the facilities. CPCS estimates that these two additional phases would generate a total of about $100 million in equipment purchases and further contracts.



Ortner's new Aero-Lite Rapid Discharge car is designed for aerodynamic efficiency, low tare weight, extra coal-carrying capacity, and automatic unloading.

Aero-Lite car is aptly named

The Aero-Lite Rapid Discharge coal car, which Ortner introduced in Cincinnati last month (*RA*, July, p. 11), is an aluminum-body, aerodynamically-engineered version of the steel Rapid Discharge car that the company has been producing for 20 years.

Ortner describes the new railcar as "the industry's first aerodynamically-refined, automated aluminum hopper car." Great emphasis was placed on streamlining during design; Airflow Sciences Corp. conducted studies for Ortner and helped with the aerodynamic modifications—which include airfoils for the top edges, partially-enclosed ends, and modified shapes for internal bracing. As a result, it is estimated that the streamlining alone can save about $300 in diesel fuel per car on a 4,400-mile round trip between Los Angeles and Chicago.

That calculation is based on a hypothetical steel car of the new design; Airflow Sciences calculated that the aerodynamic modifications reduce total drag area by 55% when the car is empty and by 30% when the car is loaded. The fact that the Aero-Lite prototype has an aluminum body should reduce fuel consumption even more (its lightweight is 51,800 pounds). Coal-carrying capacity is 105 tons.

Except for the aerodynamic modifications, the new aluminum car is very similar to those Ortner is building for the Intermountain Power Project (*RA*, March, p. 12). It features automated unloading through use of a pneumatic cylinder system independent of the train's air brake system. Center sill and bolsters in the underframe are steel.

Aerodynamics: Open-tops are next on the list

The Association of American Railroads and Airflow Sciences Corp. will be cranking up the Lockheed-Georgia wind tunnel again early next month, this time in an attempt to get a fix on the aerodynamics of open-top railcars.

Intermodal equipment—railcars, trailers and containers—was put to the test last year, under the sponsorship of the AAR, Trailer Train, Thrall Car and Budd (*RA*, March, p. 58), and at the time there were those who questioned at least the near-term benefits of the program. After all, the skeptics reasoned, unless it's something like an APL Linertrain, the average intermodal train is made up of many diverse elements, cars, trailers and containers of varying sizes, empty hitch spots and so forth.

Open-top equipment, especially equipment used in coal unit-train service, is something else again. It's most-often ordered in train-set lots, and so ways and means of improving the aerodynamic efficiency of the cars can be readily translated into fuel savings and savings in use of motive power. That's perhaps the main reason why the AAR got the go-ahead to conduct this new series of tests even though as of late July no co-sponsors had come forward.

There are at least two prototype open-tops (from Ortner and from Pullman Standard Manufacturing Division of Trinity Industries) which claim aerodynamic advantages. But present indications are that the 30%-of-full-size models that will be tested at the Marietta, Ga., facility will be models of generic cars, gondolas and hoppers.

Gondolas of two different heights will be tested, along with hopper cars of three different lengths and numbers of hoppers. Tests will be run with the models empty and with simulated heaped loads. Tests will be run with various types and spacing of bracing, interior and exterior. Tests will be run with two different kinds of covers. Tests will also be run with the models fitted with aerodynamic streamlining on the top leading edge of the car and with closed-in car ends.

There will be, in addition, two extra added attractions. After modifying a model to resemble a boxcar, AAR will run a test on the effect of wind drag on a car with its doors open. And as part of the test series, Southern Pacific plans to run proprietary tests on models of a double-stack well-type container car.

Are the stakes worth the ante? It surely seems that they are, even though wind-tunnel time and data-analysis do not come cheap, and this series may be a budget-strainer with the AAR alone footing the bill. When Pullman Standard Manufacturing unveiled Pegasus, its aerodynamic-and-aluminum design (*RA*, June, p. 61), its designers were citing computer simulations showing that the car running empty in unit-train service would be 60% more aerodynamically efficient than conventional cars. They were also quoting one railroad to the effect that fuel consumption can actually be higher on an empty-train movement than on the loaded move, in part because of aerodynamic drag.

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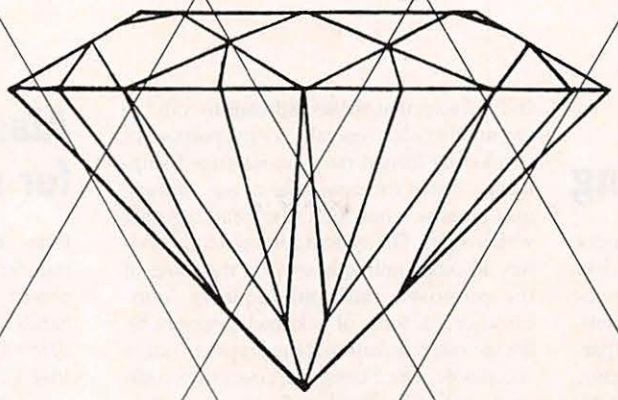
CP to expand intermodal capacity

CP Rail, which has already invested $95 million (Canadian) in its container operations, will spend nearly $15 million this year for new containers and additional terminal capacity.

CP has ordered 200 containers—150 dry vans and 50 refrigerated units—plus 137 container chassis for delivery late this year at a cost of $7 million. The railway's 1984 intermodal capital budget also includes $7.5 million for completing a new intermodal terminal at Edmonton that is to go into operation in October and $300,000 for expanding and upgrading the Saint John terminal. The Edmonton facility, which is being built at a total cost of $14 million, will be able to handle 50,000 containers and trailers a year.



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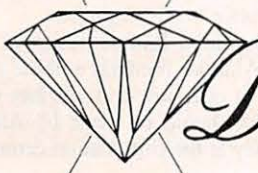

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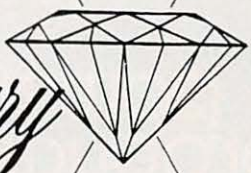

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Update

Ten roads test computerized pricing

Ten railroads are now participating in pilot tests of a new pricing system designed to permit development of joint through-rates "legally and confidentially" through a neutral central computer. The three original participants in the tests—Conrail, Seaboard, and Union Pacific—have been joined by Burlington Northern, Santa Fe, Chicago & North Western, Illinois Central Gulf, Norfolk Southern, CN Rail and CP Rail. The tests began May 29.

The National Railroad Ratemaking and Information System was devised by DSI*Rail, a business group of Distribution Sciences, Inc.

As DSI*Rail describes it: "The system employs a powerful mainframe computer and software that allows railroads to 'talk' to one another electronically for the purpose of developing freight rates on interlined shipments. Using the new system, any railroad may propose a rate for a shipment, together with a route. The system automatically notifies all other railroads serving the route of the proposed rate and requests 'concurrence,' a form of acknowledgement by the various railroads that the proposed rate is acceptable. Once complete concurrence has been obtained, all railroads receive an electronic copy of the new rate in standard EDI formats suitable for use in internal data processing systems."

David Grumhaus, head of DSI*Rail, says a major advantage for carriers using the system is that they can "quote, publish rates, and invoice from the same database." For shippers, he says, "computer-based pricing promises easier access to rates and simplified, standard rate structures."

Alaska prepares for rail takeover

If the final phase of the Alaska Railroad transfer plan goes as smoothly as its initial phases, the 520-mile railroad will be in the hands of the State of Alaska by January 1985. The Department of Transportation on July 12 certified that the state has met the initial requirements of the Alaska Railroad Transfer Act of 1982. Federal Railroad Administrator John Riley presented the certification letter to Alaska Governor Bill Sheffield in a ceremony in Anchorage.

State legislation passed July 5 established the Alaska Railroad Corporation as the entity to operate the railroad. The corporation has a seven-member board of directors composed of two cabinet members from the state transportation and economic development departments, a member from an Alaska Railroad labor union, at least one member with railroad management experience, and one member with experience as an owner and operator of a business in Alaska. Earlier legislation had granted the governor authority to purchase the railroad for the agreed price of $22.3 million.

"The Alaska Railroad operates entirely within Alaska's borders, and the decisions on how it operates, and whether or not to expand it should be made by Alaskans," said Riley at the certification ceremony.

Seaboard to buy 104 new diesels

Seaboard System President Richard D. Sanborn announced July 18 that the railroad will acquire 104 new diesel-electric units valued at $100 million. General Electric will supply 75 four-axle, 3,750-hp B-36 models for general road service. The Electro-Motive Division of General Motors will supply 29 locomotives—21 six-axle, 3,600-hp SD-50 models for unit coal train service and eight MP-15-T switchers for yard service.

"The new locomotives are needed to upgrade the railroad's fleet of nearly 2,200 units, replacing some older, less fuel-efficient models," said Sanborn. "The purchase underscores our optimistic forecast for continued growth in the economy and a corresponding demand for fast and efficient rail service in our 13-state territory."

Write in 66 on Reader Service Card

Restructured BC Rail is ready to reach out

With a heavy-duty electrified line in operation and rehabilitation of a major segment under way, BC Rail is looking considerably more vigorous than in the past. Not-so-noticeable changes, however, are just as important in the railway's effort to prosper as a commercial concern with reduced dependency on its provincial owner.

One big change is in the debt structure. The province of British Columbia recently wiped out the railway's "historic debt" by paying about $470 million into its sinking funds. That left about $375 million in debt from construction of the 50-kV Tumbler Ridge line (*RA*, July, p. 87).

Then, to reduce interest charges on the remaining debt, the railway became a subsidiary, BC Rail Ltd., of British Columbia Railway Co., which remains owned by the province. A second subsidiary, BCR Properties Ltd., acquired the non-rail real estate assets of the new parent company.

With its capital base restructured and its physical base steadily improving, the railway considers itself ready for market expansion. The next move could be like the last one—into new coal fields.

While the Tumbler Ridge branch serves bituminous mines in northeastern British Columbia, the opening of anthracite mines near Mt. Klappan in northwestern B.C. is under serious study. There, too, the market would be in Asia. The railway would move the coal directly to Stewart, which may become the province's next major port, or to a new junction with CN Rail for delivery to Prince Rupert, scene of significant port expansion.

In either case, new roadway would be required and it likely would be electrified. The railway already is considering an extension of electrification from Tacheeda, mainline junction with the Tumbler Ridge branch, to Prince George, junction with CN Rail. That 72-mile segment is undergoing a rehabilitation valued at $76 million. At Prince George, in addition, a $7.8-million diesel-shop rehabilitation is under way.

Further coal development would ensure BC Rail's break from historic dependency on forest products. Coal from the northeast is expected to double the railway's volume by the end of 1984, to more than 18 million tons.

Other prospects exist for sulfur and grain, especially around Fort Nelson, BC Rail's northernmost terminus. Contrary to the recommendation of a provincial commission in 1977, the railway decided not to abandon a large segment south from Fort Nelson. Traffic since has grown by about 300%.

Despite growth of other commodities, however, forest products will remain a major traffic-producer—especially if companies break their historic dependency on the U.S. housing industry. BC Rail serves 58 lumber mills and seven pulp mills.

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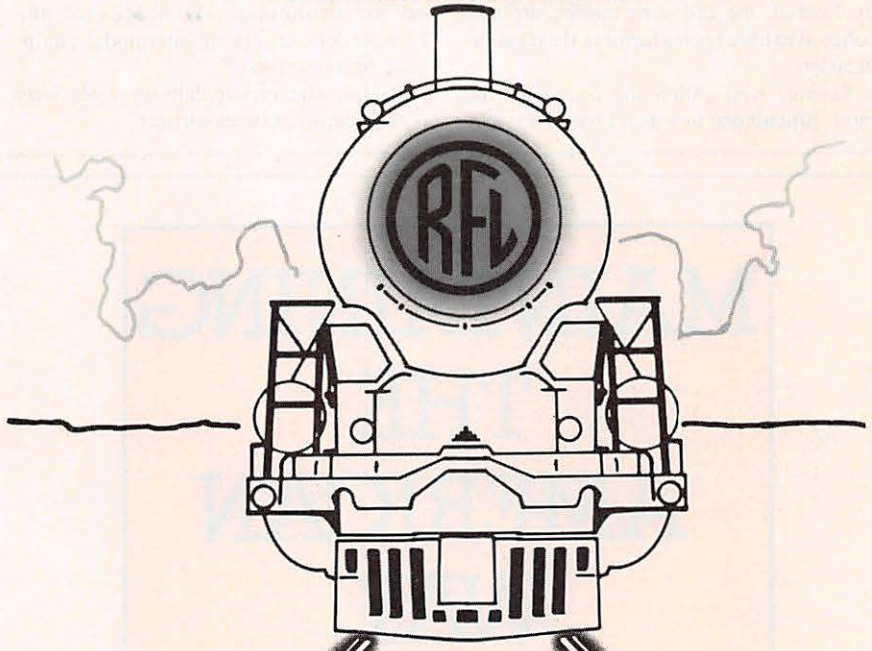

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Update

Empire State Xpress out of business

The Empire State Xpress, a daily service between New York City and Buffalo, provided the first really big operating test for the bi-modal RoadRailer—and last month Robert S. Reebie pronounced it "a phenomenal success" in proving out the equipment and in providing "the most efficient multi-modal operation in the country." But Reebie, president of Road-Rail Transportation Co., the operating subsidiary of the Bi-Modal Corp., also announced discontinuance of the service. He blamed, among other things, high train-crew costs. The cabooseless Empire State Xpress trains operated with a three-man crew. Reebie was unsuccessful in his efforts to reduce the crew to two men. Higher than expected charges by Conrail, the operating carrier, are also believed to have been a factor in the train-off decision.

Reebie, who called the decision "the most difficult one in which I have ever been involved," said he remained optimistic for the future of the RoadRailer. He held out the possibility that the company would soon be taken over by a consortium of railroads and manufacturers. He said he anticipated "some major orders" for RoadRailer equipment in the near future.

In a letter to Empire State Xpress customers, Reebie said, "During less than two years of daily operations between New York City, Rochester, and Buffalo, Conrail has provided the power and the crews to pull over 800 trains. This works out to over 11 million safe, accident-free unit miles carrying close to 19,000 loads of merchandise and manufactured traffic. Equally important, this program has demonstrated a variety of economic advantages of the RoadRailer concept of intermodal equipment and operation."

Reebie said pickup/delivery costs were 60% of those of other carriers.

Light rail for Oklahoma City?

Parsons Brinckerhoff recently completed a feasibility study of a 14.5-mile light rail network for Oklahoma City, and the City Council has approved the general plan. An alternatives analysis needs to be conducted next, and the city will be ready to request bids for that study in early 1985, according to John T. Pattillo, executive director of the Central Oklahoma Transportation and Parking Authority.

Patillo said the light rail network, which is projected to cost $156 million, would be built in three phases. The first phase would be an eight-mile line scheduled to open in 1989—the city's centennial. The city hopes to sponsor the World's Fair that year, said Pattillo, and the light rail line would connect the various fair sites. The second phase would serve the densely-populated northwest area of the city, and the third phase would connect the system with the state capitol and other government buildings; it would be completed in 1991.

"Pere Marquette" rolls again

After an absence of 13 years, passenger trains are running again between Grand Rapids, Mich., and Chicago. Funded jointly by Amtrak and the state of Michigan under Section 403(b) of the Amtrak Act, the new service was officially inaugurated Aug. 4. It is called the "Pere Marquette," after the trains that operated along this western Michigan route until 1971. Each of the communities along the route planned ceremonies to welcome the train. Regular service began on Aug. 5.

"This new passenger route will not only boost tourism in western Michigan, it will serve as a catalyst for greater economic development in this important region of our state," said Michigan Governor James J. Blanchard.

The train departs Grand Rapids at 7:30 a.m. and arrives in Chicago Union Station at 10:30 a.m., with intermediate stops at Holland, Bangor/South Haven, St. Joseph/Benton Harbor, and New Buffalo. The train leaves Chicago at 5:40 p.m. and arrives at Grand Rapids at 10:40 p.m.

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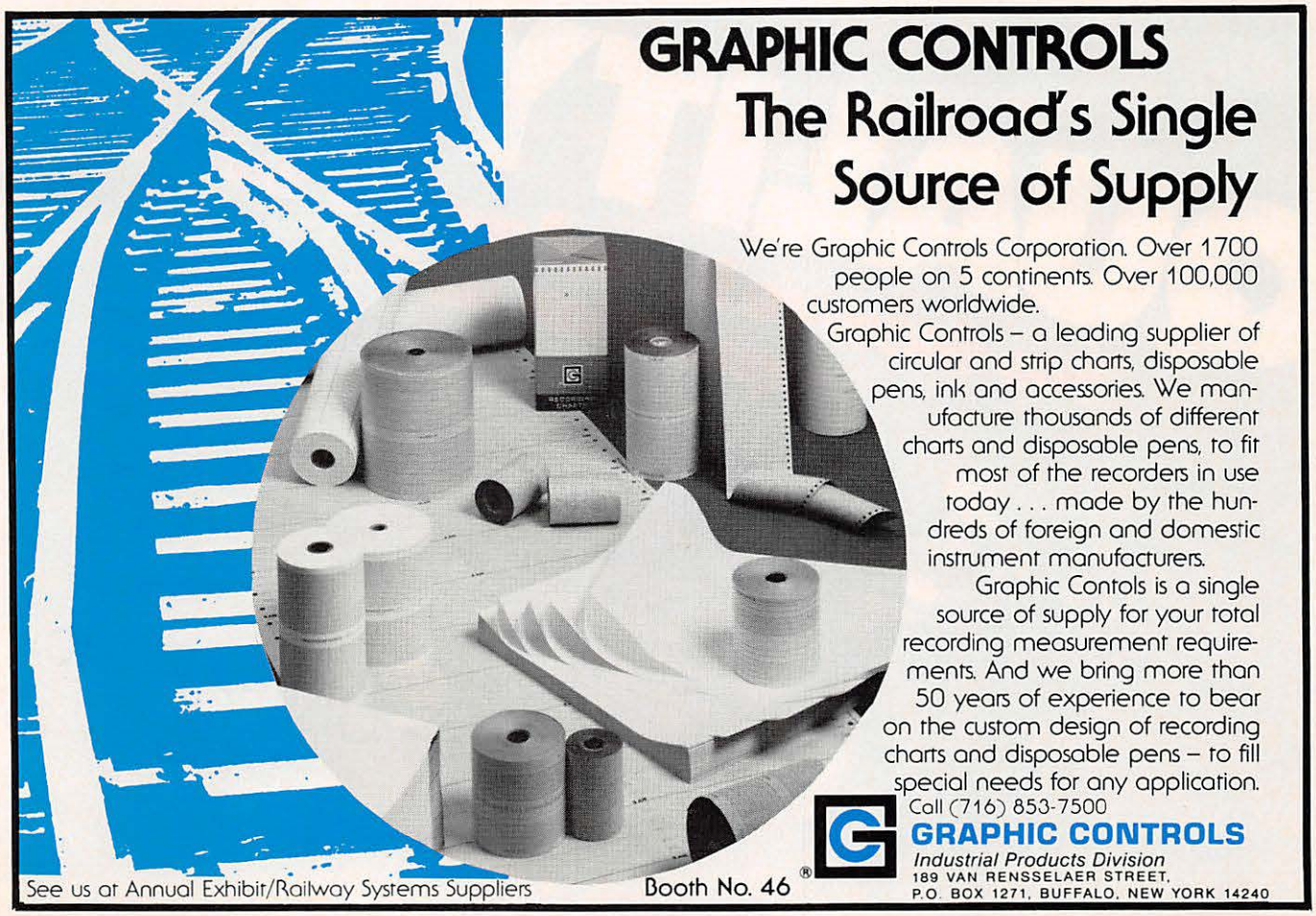
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World Report

Britain

An 80-mile, $650-million light-rail network serving Birmingham and the county of West Midlands is under study. The proposal calls for construction of an initial network of four lines, totaling 34 miles, to be completed by 1997 at a cost of $280 million. It is also proposed to spend more than $65 million to modernize the existing rail network.

Ethiopia

Construction of a 500-mile rail line from Addis Ababa to the Red Sea port of Assab is being considered by the Ministry of Transport and Communications. The new line, which would cost an estimated $800 million, would provide an alternative to the existing railway from Addis Ababa to Djibouti. A decision is expected to be reached late this year.

Indonesia

To cope with an expected annual growth of 14% for rail passenger transport and 21% for freight traffic between now and 1988-89, the government has decided to purchase 2,000 new passenger coaches and 15,599 new freight cars, and upgrade more than 2,500 miles of line and rehabilitate 423 bridges.

Mexico

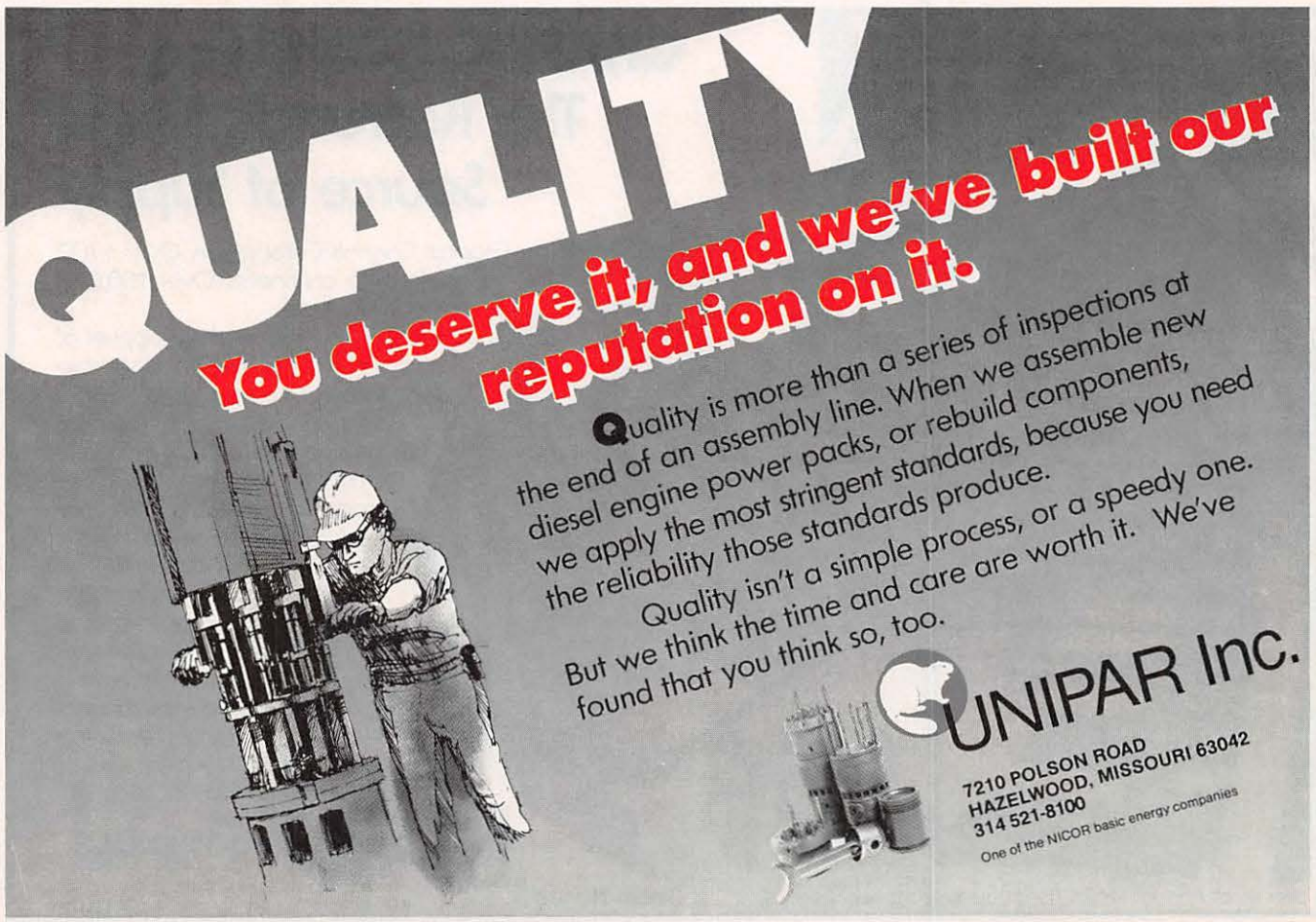
The state of Nuevo Leon has under study a plan to build a $450-million rail transit system serving the Monterrey metropolitan area. A Canadian proposal offers design by the Montreal Urban Community's consulting and technical group, BTM International, and trains supplied by Bombardier. BTM and Bombardier are not new to the Mexican transit scene: They worked together in supplying 180 rubber-tired Metro cars to Mexico City in 1982.

Saudi Arabia

Now in the detailed study stage are the proposed extension of the rail system into Saudi Arabia's western province, and construction of a rail link between Dammam and Jubail. The western proposal calls for construction of a transpeninsular line running from Riyadh to Jeddah and then on to Makkah and Medina.

Soviet Union

Prototypes of an enclosed, double-deck, auto-rack car have been successfully tested. Developed by the All-Union Scientific Research Institute for Railway Car Building in collaboration with Kalinin Car-Building Production Amalgamation, the new car is designed to carry five basic automobiles manufactured by the Volga and Moscow automobile plants.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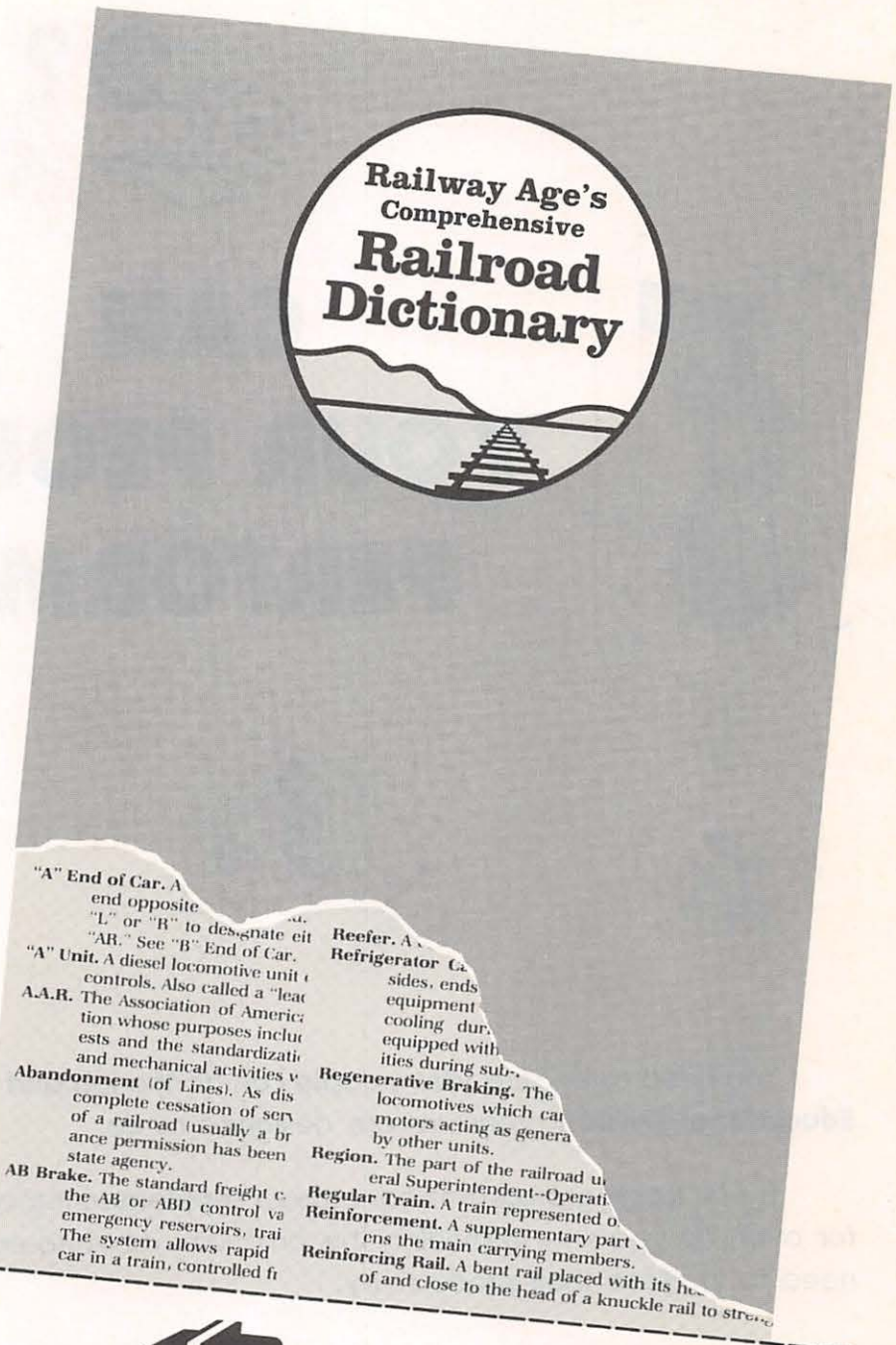
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"A" End of Car. A
end opposite
"L" or "R" to designate cit
"AR." See "B" End of Car.
"A" Unit. A diesel locomotive unit
controls. Also called a "lea
A.A.R. The Association of Americ
tion whose purposes inclu
ests and the standardizati
and mechanical activities
Abandonment (of Lines). As dis
complete cessation of ser
of a railroad (usually a br
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state agency.
AB Brake. The standard freight c
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Reefer. A
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Regenerative Braking. The
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by other units.
Region. The part of the railroad u
eral Superintendent--Operati
Regular Train. A train represented o
Reinforcement. A supplementary part
ens the main carrying members.
Reinforcing Rail. A bent rail placed with its h
of and close to the head of a knuckle rail to stre

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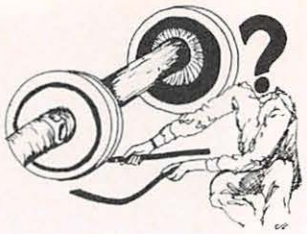

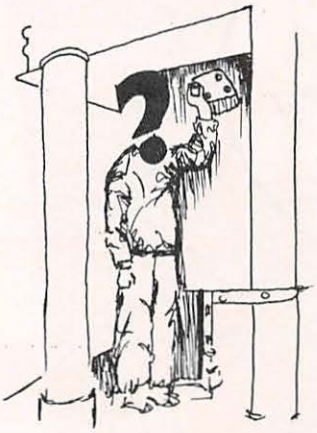

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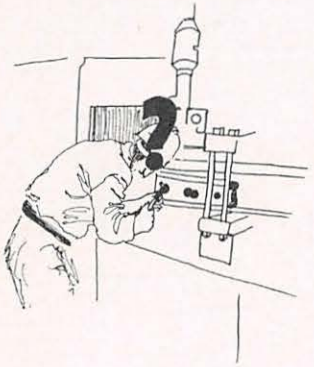

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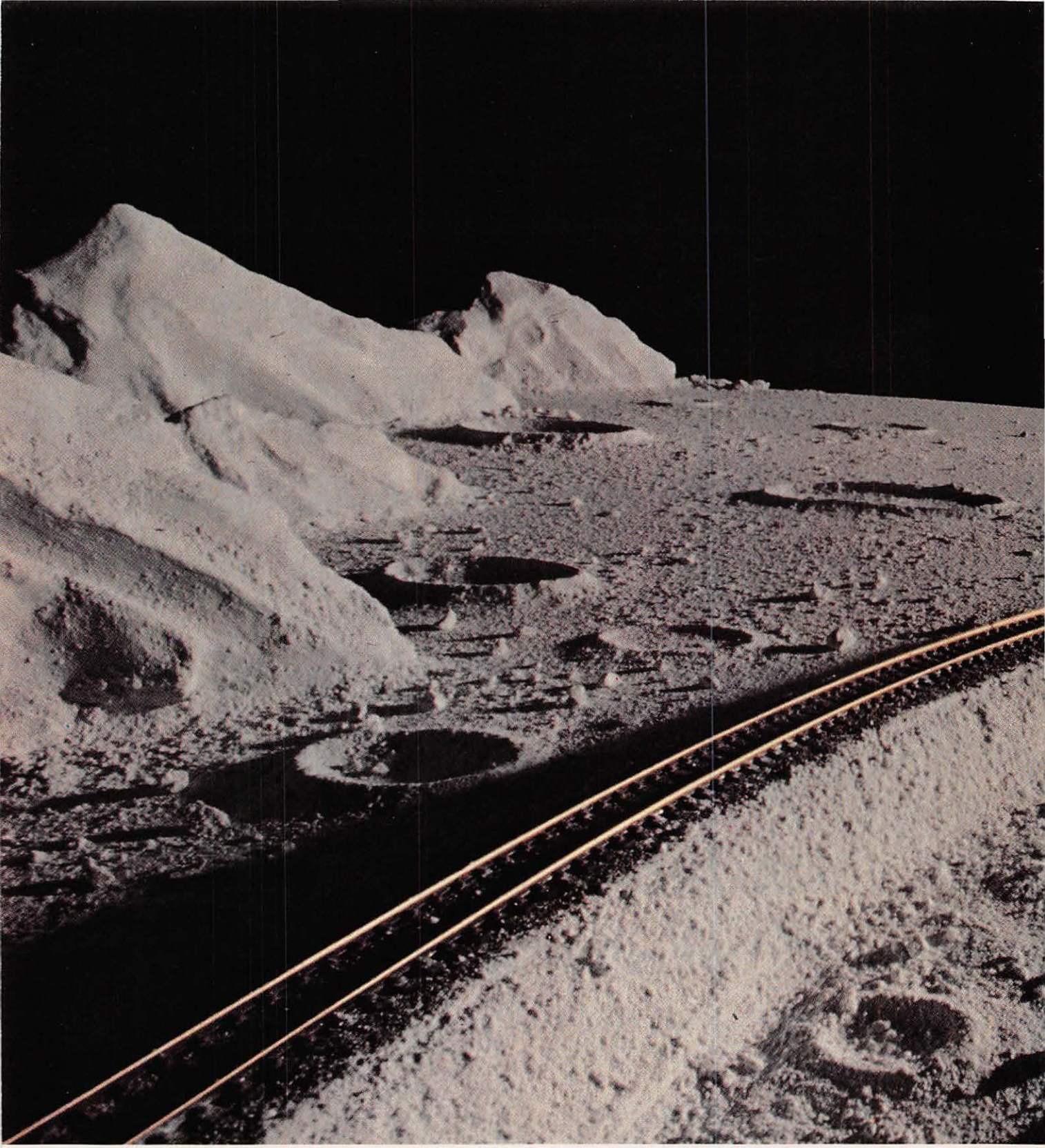

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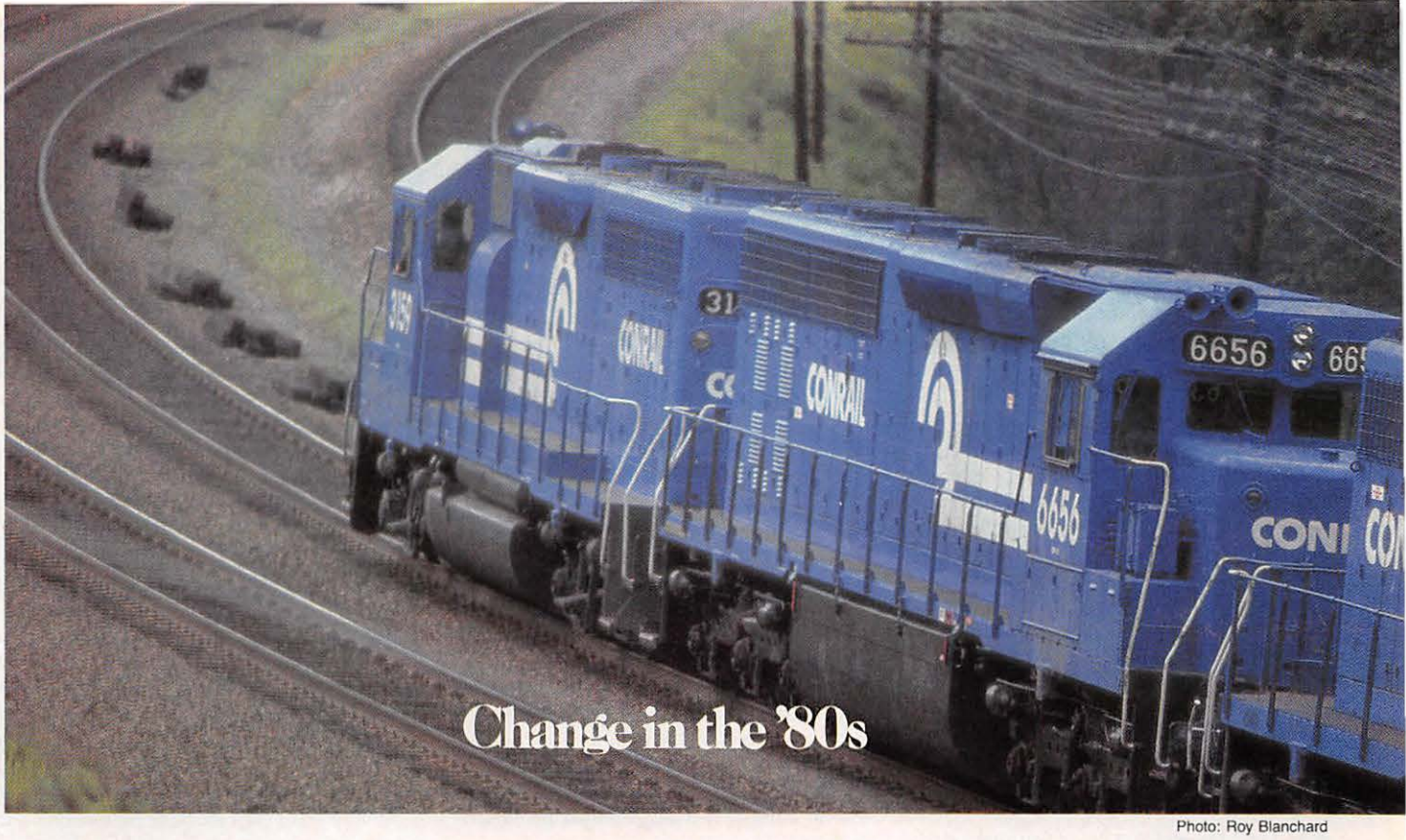


Photo: Roy Blanchard

The productivity challenge

As they strive to protect their Staggers-Act freedoms, railroads must also, says Conrail's Stanley Crane, achieve productivity gains that will help them earn re-investment capital. "If we can't do that," he warns, "we are not going to make it."

The dramatic turnaround the railroads in general, and Conrail in particular, have made under deregulation is by now a familiar story, though it's one that railroaders never tire of telling—or hearing. Where do we go from here? That, in effect, was the question put to Conrail Chairman and Chief Executive Officer L. Stanley Crane by Railway Age *Publisher Robert G. Lewis and Editor Luther S. Miller during an interview in Conrail's executive offices in Philadelphia.*

RAILWAY AGE: The last five years have been years of revolutionary change for the railroads. The Staggers Act gave them substantial freedom from regulation. Management has got a tighter handle on costs. The road to merger has been eased. In your view, do the railroads now have all the tools they need to ensure that their turnaround is truly a renaissance, and not just a flash in the pan? Or do we need even further change?

CRANE: There *has* been a renaissance—there's no question about it. If it had not been for the Staggers Act, I expect that most of the railroad industry would have gone bankrupt during the very severe decline in business in the latter part of '81 and '82 and the early part of '83. At that point in time there was a tremendous overhang of available transportation capacity. If we had not had the freedom to adjust our prices, the trucks would have run away with the business and there would have been nothing left for us. Unfortunately, some of the gains that we made under Staggers are now under attack in Washington; I will get back to that.

Meanwhile, there are still things that we can and must do within the industry. I think every railroad man will tell you that we need some adjustments in work rules. Railroad workers are among the most highly paid in the country; that's certainly true compared with our competitors in the trucking industry. Our workers are highly organized, and we are constrained by many restrictive work rules that must be eased if we are to remain competitive. I fully recognize that some of this may be at the expense of union membership. This is the age-old problem—whether the employees demand the kind of security that will risk the failure of the company and its ability to meet the payroll; or whether they are willing to make the adjustments necessary to keep the company healthy.

RA: Conrail has, of course, already made substantial gains in labor productivity....

CRANE: That's true. Early in Conrail's history the freight labor ratio—that is to say, the ratio of labor costs to operating revenues—was in the mid-60s. When I came here in 1981 it was in the mid-50s. Today it is down to about 40—partly due to wage-increase concessions that amount to approximately $120 million a year. But we need additional—and permanent—improvements in productivity. It has been demonstrated, for example, that you can run with less than full crews, particularly where there's no significant work to be done between origin and destination terminal. There are even trains running in the world today without a locomotive engineer. Now I'm not suggesting that we get rid of the engineer. What I'm suggesting is that we don't need all of the people that we have on those trains today, particularly when the train does not have to be made up or broken up between origin and destination. Somewhere down the line we are going to have to be able to reduce labor costs in that area or we are going to suffer competitively. We must reduce our costs if we are going to have enough left over out of the gross revenue dollar to buy the things other than labor that are required to maintain and operate a railroad and generate

sufficient excess cash flow to reinvest in the facility. If we can't do that, we are not going to make it.

RA: How far have you been able to go in eliminating cabooses?
CRANE: As of July 10, Conrail has eliminated cabooses on about 10% of all local and traveling switcher assignments and about 20% of all yard assignments. This amounts to about 40 local and traveling switchers and about 50 yard assignments. This was based on the Jan. 9, 1984, arbitration award. Under the May 1 award for road trains, Conrail is authorized to eliminate cabooses from 25% of the annual conductor starts, based on 1981 levels. So far we have eliminated cabooses from about 40% of these entitlements, on a conductor start basis. Specifically, cabooses have been eliminated from four mail, 19 TrailVan, and 22 road freight trains. Keep in mind that the award is based on conductor starts—not trains—and individual road trains can have anywhere between one and five conductor starts, depending on distance traveled.

RA: The Staggers Act is, as you suggested, under increasing attack in Washington by a number of lobbies, the most active of which appears to be that led by the utilities and the coal interests. Do you see the threat of some degree of reregulation as a serious one; and if so, how do we combat it?
CRANE: All you can do to combat it is to expose the facts to the people who will make the final decision. We are in the process of fighting cases before the courts right now in which it's alleged that the rates we've published on coal under the Staggers Act are too high. It's a continuing problem of education. You can get these rates so low that you will not be able to operate a railroad and maintain it. I think Bill Dempsey and the AAR have done a very good job putting forth the information to show that the inflation in railroad rates has been very minimal over the last 10 years, and particularly over the period of the Staggers Act, and that it bears no relationship to the relative inflation in the cost of coal.

We have other problems in Washington. We have recently heard comments from a federal court suggesting that the ICC really ought to take a new look at regulation and the merits of it in order to protect the small shipper. Let me say this: Nobody is more concerned about the small shipper than Conrail. But you can protect the small shippers so that there won't be any big shippers left—and then there won't be any small shippers.

RA: How about other parts of the Staggers Act—or the ICC's interpretation of it—that are under attack? For example, using the cost of capital as a measure of revenue adequacy?
CRANE: Again, the only thing you can do is to try to educate, to point out that you can either have an industry that has adequate revenue to support its requirements for capital investment and continued growth, or that you can starve the industry and cause it to decline in its ability to serve its customers. We do not now meet the revenue adequacy test—indeed, there are substantial capital investments we would like to make if we had additional cash flow and better profit margins. You've got to look at this from the standpoint of the investor. If you take the amount of money after taxes that the railroad generates, why invest it back in the railroad if the rate of return is only a little over 4%? Why not put it into government securities at 10%?

RA: Some economists are saying that as we move more and more toward a high-tech economy, there will be very little real traffic growth; and that the railroads, if they are going to grow, must win more traffic from the highways. What are your views on this?
CRANE: I don't know that I share their opinion that the great growth in this economy is going to come from the high-tech and service industries. Look at the so-called pyramid of human wants. The first thing is food and the second thing is housing. Neither of these is high-tech.

But I certainly share the opinion that we must win more traffic from the highways. The railroad industry's share of intercity freight ton-miles is now just under 36%. Not long ago it was 50% or more. Piggyback is one way of getting back some of this traffic, and at Conrail we are working hard at it. Conrail now handles about 16% of all piggyback traffic in the country; our piggyback revenue last year, excluding mail, exceeded $400 million. We have worked aggressively to improve the profitability of our piggyback business; we are more than paying our variable costs. Again, all of this takes capital investment. Since I came here we have invested $30 million to $40 million in piggyback. This includes capital investments by Pennsylvania Truck Lines, the subsidiary which operates our terminals. So far this year, Conrail has acquired six Piggypackers valued at about $450,000 each. In addition, we have purchased a used Piggypacker and we plan to rebuild six.

RA: The trucking industry is not as capital intensive as the railroad industry, and it is getting to be less labor intensive, with a large amount of freight now moving in non-unionized trucks...
CRANE: That's why we must increase our productivity, in terms of both capital and labor; and that's also why we must continue to strive for a more equitable allocation of the right-of-way costs of the trucking industry. Just recently, Congress tried to do something about that; they passed a law increasing the truckers' user taxes. Now they have changed the law.

I think the truckers are soon going to be in trouble, because there is not sufficient money being put back into the maintenance of the national highway system. Somewhere down the line that infrastructure is going to crumble

Piggyback: Stanley

Conrail's concept of wholesaling piggyback to avoid the creation of an expensive sales force, and the railroad's determination to get a firm fix on return on investment before buying new technology were key points in a presentation Stanley Crane recently made to the Intermodal Transportation Association.

"We read about intermodalism being the "wave of the future" and about the substantial gains in piggyback volume experienced by some railroads, even through the worst recession in 50 years. It might appear that the most anyone need worry about is how to stay clear of this gravy train for fear that any effort to manage it may derail it.

There is, in fact, some distance in the learning curve still to be travelled before we can say that we are reaping the efficiencies of a truly intermodal transportation system. It is not our ability to develop efficient equipment designs that concerns me. It is not our ability to build more efficient intermodal terminal facilities that concerns me. And it is not our ability to come up with the innovative marketing techniques to go along with the new equipment and the new facilities. What does concern me is the implementation of these solutions. That includes how we price intermodal services to make it easy for the shipper to buy them, how we manage the costs so that we can maximize our coverage of the intermodal market and our equipment use, and the care with which we advance our investments to stay competitive.

Conrail's intermodal strategy has four facets. The first introduces our view of the railroad as a wholesaler of high-quality line-haul train service to third party volume shippers who provide retail, door-to-door transportation service to shippers. The second is to manage our volume/cost relationships to maximize train profitability, reduce excess capacity to existing trains, and increase backhauls. The third is to achieve unit cost reductions and efficiencies so that we can compete with trucks and give ourselves some additional leverage for our fourth objective: Investing in terminals and equipment innovations that will be imperative to staying competitive in this business.

Loadings under the volume shipper program account for about 50% of Conrail's piggyback business, with most of the other half retailed to the shippers of perishables, U.S. Postal Service and United Parcel Service. Altogether we have a standard agreement with about 125 freight forwarders, shippers' agents, shippers' associations, steamship lines and motor carriers, who commit themselves to providing a minimum volume for Conrail. We provide them with a comprehensive, ramp-to-ramp price schedule for our en-

Crane would rather get it for you wholesale

Photo: Roy Blanchard

APL double-stack container cars are newcomers to Conrail's Kearney, N.J., yard. The cars are now in cross-country unit train service.

tire piggyback service network.

We found it more efficient to buy this intermodal sales force than to create it ourselves. And we believe that we can provide far greater sales coverage at a lower cost.

The other key to this program is how we manage our pricing. We already have direct computer entry at prices covering our on-line piggyback loadings, which enables us to provide up-to-date pricing circulars to our volume shippers.

But I think the most exciting development in pricing is a contract we have signed with Distribution Sciences, Inc.

DSI will design and implement a computerized through and local rating system. Conrail will use the system to speed the administration of local and interline piggyback rates, deregulated boxcar rate quotations, and the recently restructured through boxcar rates for pulpboard and canned goods.

Conrail and other participating railroads will be able to enter their rates into the system. The system will add these rates together over the applicable routes. Users will then be able to obtain independent factor and joint through rates electronically. The system also will assure that only those railroads that are direct connectors over a given route will have access to the rates applicable to that route.

As a result we should be able to manage the explosion of new prices and options for shippers much more efficiently. And we will be able to provide shippers with immediate information about what rates and routes are available to move their goods at the lowest possible cost.

The second facet of our strategy is managing the volume/cost relationships better. The idea is to maximize train profitability by reducing excess train capacity.

For example, once we decide to operate a piggyback train we have also committed ourselves to three locomotives, five or six crews and a caboose. Those costs become fixed, and each car added to that train is incremental—adding very little to the cost of the train. Since 1982, we have increased our average cars per train from less than 50 cars to more than 60 cars per train. We recently averaged 78 cars per TrailVan train eastbound from Chicago and 76 cars per TrailVan westbound. So we are improving the profitability of our trains.

Another way we are filling capacity is with corridor managers whose job it is to correct our imbalance in traffic flows—heavy loadings eastbound and light loadings westbound. Our goal is to fill all of the empty westbound trailers we can through backhaul incentives.

Volume reduces average costs, but we are also seeking every possible chance to reduce unit costs. Every dollar's worth of cost for drayage, for labor, equipment, fuel and for terminals is under study. If we are to compete successfully, we need to offset the productivity gains truckers will achieve with the more liberal size limits established by federal legislation.

Another key effort in improving our efficiency is run-through trains. At our Streator, Ill., connection with Santa Fe, for example, we interchange trailers by steel wheel rather than by city streets. The trailer rides on the same flatcar from orgin to destination, and a Conrail locomotive stays with the train until it arrives at Santa Fe's Argentine Yard at Kansas City. With run-through service we are able to reduce interchange costs at gateways by $100 per trailer. We have a similar agreement with Burlington Northern and others are in negotiation.

Lower costs and streamlined operations have contributed to improved margins in piggyback, which in turn provide some capital investment availability for terminal and equipment innovations.

In the last three years, we have constructed a new terminal serving the Philadelphia area; expanded terminals at East St. Louis and Baltimore; and invested in improved facilities at four other terminals. We have lengthened 2,000 trailers to 45 feet to compete better with highway trucks, and we will stretch 2,000 more trailers this year. We are investigating and investing in flatcar technologies that save fuel and improve utilization. By the end of the year, we will be running more than 250 second generation single position platform cars assigned to Conrail from Trailer Train. And new double-stack marine containers from American President Lines will soon be operational on our system.

The technological possibilities are exciting. But the investment dollars can be staggering. Deregulation demands, more than ever before, that improvements be based on costs and the ability to compete in a free market. The key is to consider each advance in technology in the context of its cost and the market environment into which it will be introduced.

That is the management challenge for the future. ”

A story of extraordinary effort and astonishing achievement

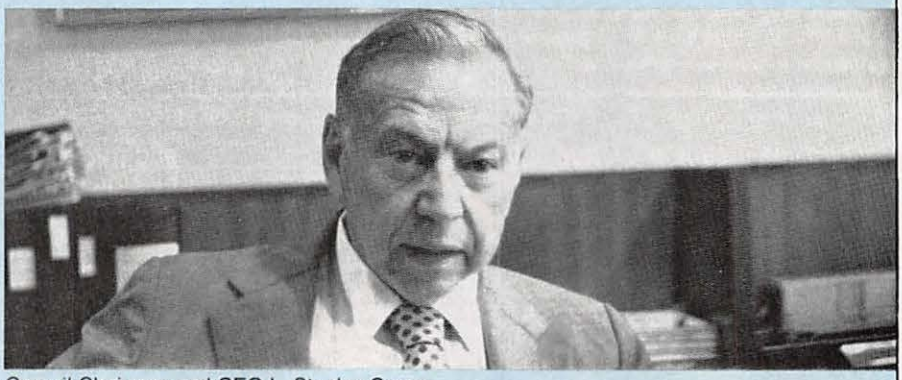
The Conrail comeback story is one that sends business writers scurrying for words strong enough to describe it. "Extraordinary" and "astonishing" are among the favorites.

"Extraordinary" is certainly the word for Conrail's financial turnaround. After losing $1.5 billion during its first four years of operation (1976-1980), Conrail slipped into the black in 1981 with a $39 million profit. In 1982, the railroad netted $174 million; in 1983, $313 million. Earnings this year are expected to be in the $450 million to $500 million range.

All of this has not been brought about by financial wizardry or marketplace miracles. It has been achieved slowly, and sometimes painfully, by a management-employee team dedicated to preserving their railroad—and their jobs.

Conrail's first four years were years of rebuilding—a federally-funded, multi-billion-dollar effort ably presided over by Edward Jordan, who as head of the United States Railroad Association was present at the creation and then moved to Philadelphia as the railroad's first CEO.

When the Staggers Rail Act of 1980 came along, Conrail was ready to take advantage of it, with a trimmed-down, rebuilt plant and with an aggressive marketing team headed by James A. Hagen. At about the same time that Staggers became fully effective, L. Stanley Crane moved in as CEO and, in the words of one veteran dating from the days when the Pennsylvania was the standard railroad of the world, "began to operate this property like a railroad."



Conrail Chairman and CEO L. Stanley Crane.

There were further pluses for Conrail in the watershed year of '81: In April wage-increase concessions were negotiated with the railroad unions; those concessions are now valued at $120 million a year and have been an important factor in keeping Conrail profitable in a shrinking market. That year also saw passage of the Northeast Rail Service Act, which mandated the transfer of commuter operations to state and local agencies (a process that was completed on Jan. 1, 1983); gave Conrail additional latitude in closing down uneconomic lines; and authorized federally-funded, one-time separation payments to displaced workers instead of the up-to-age-65 compensation guarantees formerly in effect.

All of these things have helped, and helped enormously, but it is the railroad's success as a provider of efficient, reliable transportation that bodes best for its future. Last year, Conrail operated a weekly average of 3,653 through freights, 187 TrailVan trains, and 1,570 local freights. On-time performance: Dock-to-dock (within 24 hours of schedule), 81.1%; Trailvan (within one hour of schedule) 86.3%; unit trains (within one hour of schedule), 94.9%.

to pieces. The truckers don't have enough vision to recognize that—and in that respect, I suppose, they are really not too different from the way the railroads used to be, when at one point they did not have enough vision to recognize that you had to maintain tracks if you were going to stay in business.

We did recognize that finally, but we still have to learn how to maintain track for less money than we do now. We are going to have to improve our maintenance of way productivity. We will need better materials. High-quality ballast is of fundamental importance. On this railroad we don't use anything except traprock on our main lines—we haul it hundreds of miles. The development of permeable fabrics has been tremendously important in correcting muddy track conditions. It's not cheap, but we're using it like it's going out of style. I cannot put it too strongly: We have got to learn how to maintain track for less money and have it stay in good shape for a longer period of time. The days when you sent out a section gang and they hit a little lick every day are gone. Track maintenance has become a high-tech business.

RA: We are also seeing some other high-tech developments—in motive power, for example. Would you comment on your reasons for ordering 200 new locomotives at a time when you had many in storage?

CRANE: The reason for that is very simple. No matter how much you rebuild an old locomotive, you can never come up with all of the engineering improvements that come in the new models. You cannot get the fuel efficiencies, and it's difficult to get the tractive effort which is being generated by the improved wheel-slip systems. The locomotives that we recently purchased were projected to have a fuel efficiency advantage of 8% to 9% over the existing fleet. They have proven to have a fuel efficiency advantage of 9% to 11%.

RA: How about your freight-car fleet?

CRANE: It is in superb shape. Our current bad order ratio is 3.1%. We have a few specialized needs—for example, at Hollidaysburg we are building 250 gondola cars for scrap shipments. But we have achieved great improvements in car utilization. For a period of time we needed far more cars on this railroad then we need today, even to handle the same amount of business. The track structure was bad, and the locomotive bad order ratio on any given day was 25%. Today it is 7% to 8%. As we got better, it took fewer locomotives and cars to handle the same amount of business. As a result we were able to scrap a lot of the old stuff, and on top of that we bought a number of new hopper cars.

RA: Can you quantify the improvement in car utilization?

CRANE: The best measure of overall freight car utilization is foreign cardays on line per load in foreign cars. This represents all transportation improvements, distribution improvements, and reloading; it also has the greatest impact on the corporation's bottom line. Foreign cardays per load in foreign cars has decreased from a high of 15.5 in 1979 to 11.5 in 1983; so far in 1984, it is at 10.7—a 29% improvement from 1978, when it was 15.0.

RA: Speaking of bottom lines, Conrail's has changed dramatically since you came to the railroad. You recently reported first-half earnings of $269.8 million and forecast a profit for the calendar year of $450 million to $500 million. What is your management secret?

CRANE: One of my great prides—and if I've said this once I've said it a hundred times—is that when I came up here from Southern, I didn't bring a single soul with me, not even a secretary. All of the people that know how to run a railroad were right here on Conrail. All you had to do was set your goals and objectives and point them there and get them going. And that's what has caused this company to do what it has done. ■

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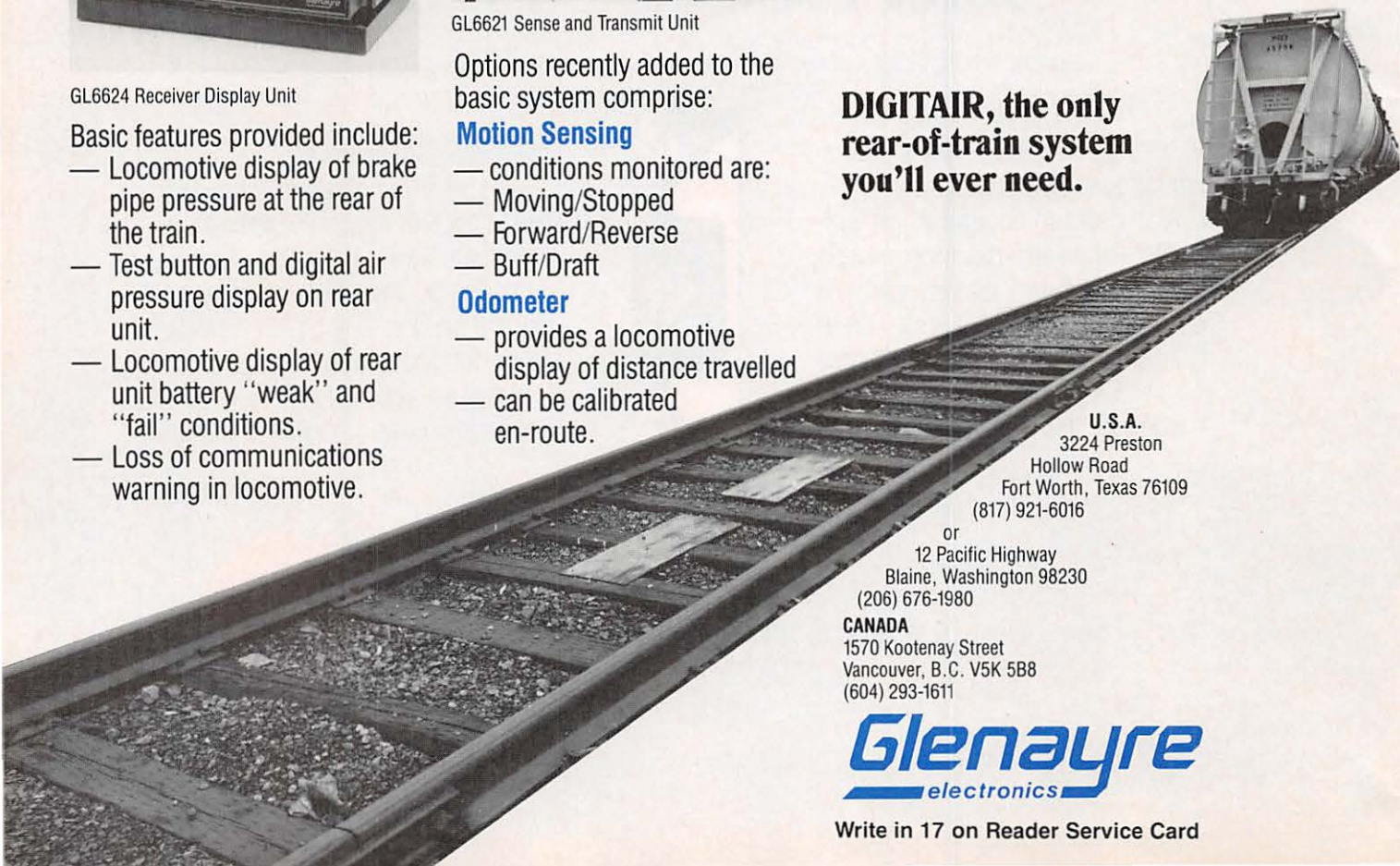

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Micro magic—and ATC

The microprocessor could be the key to the Advanced Train Control System now being sought by U.S. and Canadian railroads. In prospect is a new era in the management of train traffic.

By JOHN ARMSTRONG,
Associate Editor

You needn't look very long to find a train cooling its wheels at a meet after a track-speed dash to get there; not exactly rare are locomotive consists whose lead unit is there only to provide the species of train control needed over part of its journey; watch a dispatcher on the day trick, and you'll find a surprising fraction of his time and attention devoted to the train order, phone and radio traffic it takes to let track forces get at least some part of a day's work accomplished safely.

Can the enhancements in dispatching, communication, identification and control technology made possible by the microprocessor add up to the dawning of a new era in the management of train traffic?

A team from seven large and small railroads north and south of the border, during a year-long study, generated advanced system concepts promising enough to cause the Railway Association of Canada and the Association of American Railroads to set up an Advanced Train Control System (ATCS) development program (RA, June 1984, p. 21) based on their spadework and call a "Public Meeting" in Toronto which would kick it off—and, as an aside, provide feedback on the breadth and depth of interest in the matter.

After early response slow enough for some sponsor nervousness, interest accelerated beyond expectations; among the 440 attendees were representatives of 130 potential supplier organizations and of railroads representing 75% or more of North American railroad route miles.

The audience heard a thoroughly organized presentation of a dream—a future in which those time- and money-wasting situations would be far rarer, where locomotives would haul trains freely, safely and efficiently over main, secondary and branch lines under control as sophisticated as economically justifiable.

● **The ground rules.** As explained by AAR Research & Test Vice President William J. Harris, Jr., and ATCS Project General Manager Peter J. Detmold, important ground rules for the program include:

—No governmental support is sought or involved. (Assistance from export technology or other programs which a supplier might seek is independent of this project.)

—Association and railroad-industry research support will address only system engineering and such matters as characterizing the environment and operational situations to which ATCS components and systems must respond and developing efficient methods for evaluating performance acceptability. Research aimed at development of any specific set of components or circuits will be the responsibility of the supplier at his expense.

—A systems engineering consultant with experience in melding diverse technologies into an operating system of ATCS size and complexity is being engaged to support the program. The successful bidder for this contract is debarred from simultaneously being a component or system developer/supplier.

—Technology to be proposed is up to the supplier; as system concepts and alternatives which can provide required performance while meeting modularity and industry-wide compatibility goals are identified, functional requirements for individual components will evolve to the degree necessary to assure interchangeability.

—Proprietary information will be respected but it is up to the supplier to maintain his own patent protection.

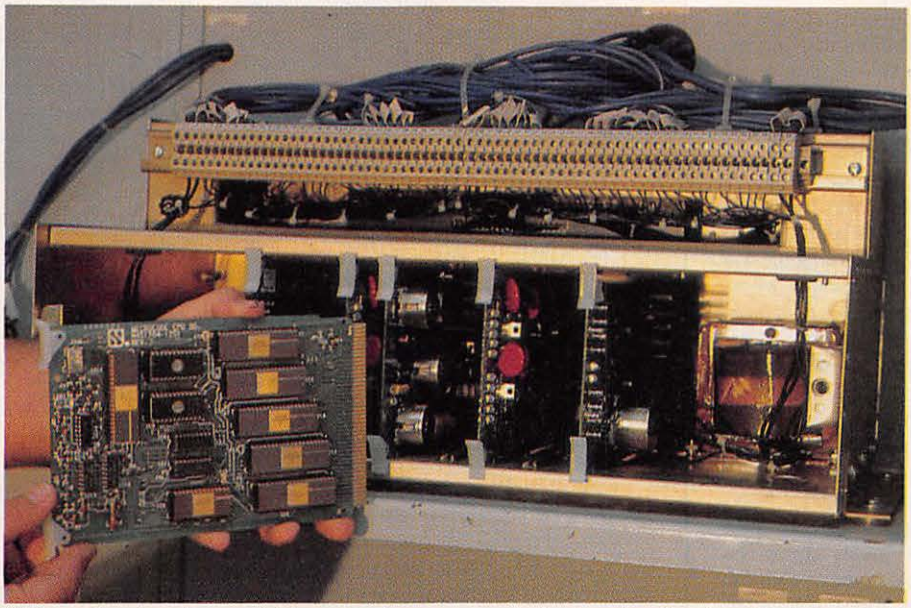
"The challenge is ... organizational. How can so many railroads and so many suppliers cooperate in an orderly, intelligent and business-like manner and yet preserve the essential nature of a competitive market process? During the coming months our principal objective must be to learn how best to achieve this," Detmold acknowledged.

"All my life I've been hoping *two* railroads would specify the same thing—the idea of *seven* agreeing on anything never crossed my mind," observed one traditional signal supplier.

During this system engineering period, key contact points among an established heirarchy of executive, steering and advisory groups of railroad representatives are W.J. Moore Ede of CN and C.E. Taylor of the AAR.

● **Can it be done?** Some new options in the complete system—for example, continuous monitoring of longitudinal rail stresses so that trains can proceed at normal speed with positive assurance against track buckling in any season of the year—will require research to confirm feasibility.

Automatic, continuous train control under computerized central management is certainly feasible; it takes place routinely on some of the newer transit properties. Here, it's more a question of the ability of the new technologies to reduce the price to a point where it will pay off on longer railroads with



C&S suppliers have been quick to apply microprocessor technology to railroad needs. One example is Union Switch & Signal's Microcode coded track circuit system.

less dense and more diverse traffic.

Moving downscale, today's new ctc installations, with or without one or another of the established forms of computer-aided dispatching, already lean heavily on microprocessors in providing many ATCS capabilities at a price that sells a few hundred new miles a year. *Compatibility with ctc* is a firm requirement for all ATCS modules.

Microprocessor vital circuits paralleling existing relay interlockings have been in the field for some time now—a moderately complex GRS installation at Chili Jct., N.Y. on Conrail (extending to the track relay terminals) and a US&S siding-control interlocking (including all functions except switch-motor power transfer) at a deliberately chosen hot and lightning-plagued location on the UP (Modena, Utah). Both are thoroughly instrumented—with microprocessors, of course—to generate the long-term comparative performance data it will take before the chips are allowed to take over actual control.

With all the self-checking capabilities readily programmed into such circuitry, *conceptual* safety levels are less of a stumbling block than the demonstration of overall system freedom from "wrong side" (to use the British term) failure possibilities that only experience in the environment can fully generate. On the reliability side, everything but experience (including living through lightning seasons) should be on the side of the micros; they're small enough for full redundancy if that is chosen as the way to go, and self-diagnostic circuitry with pretty LED's shining away reassuringly or pointing the way to a quick fix represents a technique whose effectiveness has long since been demonstrated in non-vital systems.

• Help for the secondary main lines. Percentagewise, the largest operating savings from applying an appropriate level of the ATCS technology are expected to accrue on those thousands of miles of line where traffic is increasing but in terms of today's heavy trains is not dense enough at current capital and maintenance costs to justify ctc or perhaps even automatic block signals. With micros and today's communications technology, the ATCS study suggests there may be ways to expedite trains with something costing significantly less per mile.

Though suffering somewhat from the piecemeal obsolescence that threatens all pioneers as technology advances relentlessly during a long gestation period, the Glenayre Electronics LIC (Location, Identification, Control) system already installed on the 156-mile Squamish Subdivision of the British Columbia Railway definitely points in this ATCS direction; its microprocessor-controlled cab display unit provides communication "in writing" directly between the dispatcher, his computer and the engineer as well as continuous identification of train location to a finer degree (¼ mile or better) than typical of conventional ctc installations.

"The creation of a new generation of train

The anatomy of a microprocessor

The microelectronic chip which performs *central processing unit* (CPU) functions is properly known as a *microprocessor*; mated with memories, input/output ports and other essentials, it becomes a *microcomputer.*

For limited, specific applications—such as those video games whose explosive popularity helped create the production volume driving miroprocessor costs down to current levels, copy-machine controllers and the like—all the elements of a microcomputer may be put on a single chip using MSI (medium-scale integration) or LSI (large-scale) manufacturing technology. As the state of the art advances, ever larger and larger (VeryLSI) systems may be put on single chunks of silicon to further confuse a field where strict definitions remain blurred as the speed of technical advance outstrips widespread agreement on precise terminology.

As a refresher on some of the principles and acronyms bandied about in discussions of today's typical railroad applications, a look at microprocessor-based systems in the capability range of the "desktop" or "personal business computer" may be illustrative. Many technical developments, only the most significant of which can be discussed here, had to come together to make possible the sudden explosion in capability and collapse in size and cost represented by the micro. Its essentials include three "buses":

—The *Address* bus allows the CPU to specify the precise bit of information (a 1 or a 0, since everything is binary) to be massaged at any point in its machinations. In a typical micro this bus is 16 bits "wide," allowing it to directly address any of 65,536 locations—rounded off as "64K" since 1,024 (2 to the 10th power) is handily close to 1,000.

—The *Data* bus is the line on which all the exchange of information among the various parts of the computer and with the outside world must take place. Its width determines the number of bits that can be handled at one time; since this determines the speed and degree of precision with which data can be processed, it is has become the number (8-bit, 16-bit) used to characterize the sophistication, cost and snob appeal of the processor as a whole.

—The *Control* bus tells the elements involved which of a very few basic operations—e.g., "read from memory"—the CPU is directing to occur.

Bus structure and circuitry has been standardized on a few types, each supported by numerous vendors, designed to suit various applications, physically interconnecting and making possible plug-in exchange of the *nodes* (memories, input/output ports, CPU's themselves, etc.) which go together to make a computer.

The only reason that all those nodes can be left connected directly to the buses without resulting in a hopeless mess of conversations on the "party line" is the invention of *tri-state logic* chips capable of *three* output states—"0" or "1" plus an inactive one in which *both* terminals are off and the device electrically disappears. Compared to the alternative multiplex ("mux") technique of switching such connections on and off, tri-states have enormously simplified computer design; unfortunately, they also require new methods for troubleshooting since scope traces of bus voltages no longer indicate what's going on where.

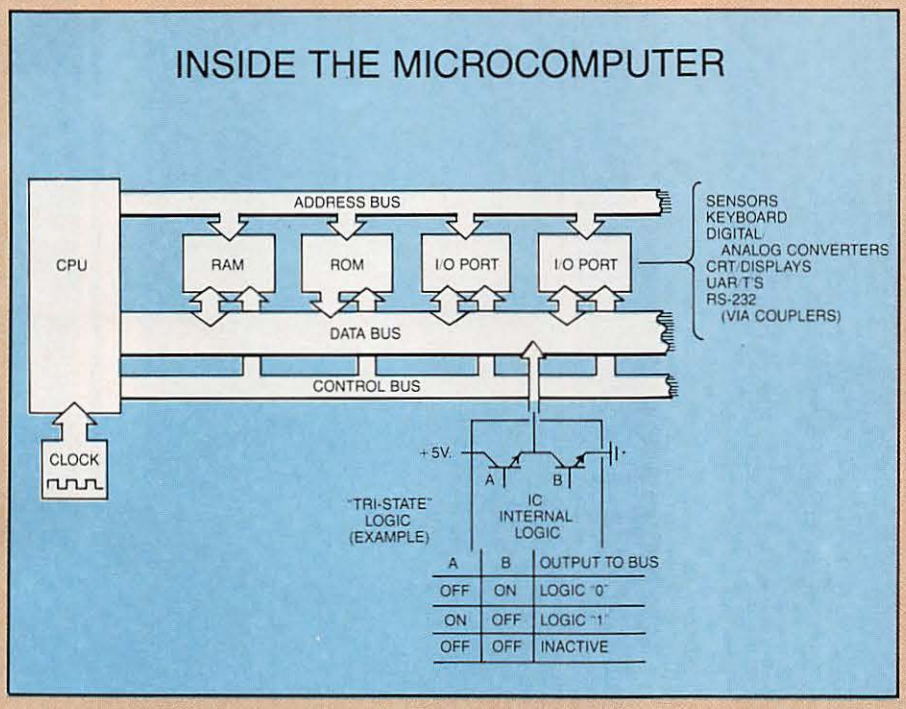
A *clock*, cranking away at 2.5 MHz or more, runs the CPU through its duties in sequence, including appropriate delays within operations for pulse settling, signal travel times and the like. Individual operations are thus occurring in less than one millionth of a second.

• Memories, memories. The computer needs at least some *non-volatile* memory—enough information which will not be lost when the power is off to let things get going again on start-up. The rest of the software *programs* that teach the CPU how to do something useful, typically inserted from a floppy magnetic disk in the personal computer, must somehow be built into a dedicated, stand-alone micro (such as an end-of-train monitor) which can't afford the space, cost and fragility of a disk drive. This is done with solid-state *read-only memory* (ROM) which the CPU can refer to without being able to alter (or lose) it.

Somebody has to write before reading can take place. If a reasonably large number of identical units are to be produced, the information may be built into the ROM's tiny solid-state memory cells by custom masking during the photographic manufacturing process, producing a *programmed* read-only memory (PROM).

Since if the computer is to work the PROM, including every bit of the programming, has to be perfect in both manufacture and software design, for many applications the advent of the *erasable* read-only memory (EPROM) was the key advance. The chip is programmed electrically (at a higher voltage than in the reading operation); after exposure to a dose of ultraviolet, the chip is again virgin and can be reprogrammed for a different use—or, imprinted with a *corrected* program, suggesting the irreverent comment that presence of an EPROM in a micro-controlled unit may be evidence that software development isn't really complete.

Farther down the pike is the *electrically* erasable chip (EEPROM), which can be reprogrammed in situ, opening up possibilities for both versatile manipulations—en route in



a vehicle installation, for example—and possible unintended modification if the special reprogramming power gets loose.

Memory is expressed in terms of eight-bit bytes, with standard chips providing 64K typical in recent times and available capacity continuing to escalate past 128k.

Also needed is *read/write* memory with which the CPU can rapidly exchange information-in-process as needed. Contrasting characteristics of particular species of solid-state technology capable of providing this RAM (*random-access memory*) are likely to govern selection in a particular computer. CMOS (Complimentary Metal/Oxide Silicon) technology is noted for extremely low current consumption, important in long-life battery-powered applications; standard bipolar systems typically allow faster switching. A specialized process computer may get by with as little as 256 bits of RAM; versatile personal computers adaptable to such programs as word processors or spread-sheet calculations and the large fields of information they handle are typically built around 64K*bytes* or more of RAM.

• **Input/output.** The microprocessor itself is physically rather rugged and, in comparison to traditional CPU's found in mainframe computers with their tendency to go into a funk if not kept within very close approximations of ideal "room temperature," it is capable of being built to function reliably throughout a temperature range approaching that within a ventilated but not air-conditioned signal bungalow. The thermal capacity of those thousands of transistors and other electrical components on the tiny chips being essentially zip, however, *safely* connecting the brains to the outside world is another one of those key technological triumphs. Frequently used is the *opticoupler* in which external electrical signals, converted to light by a photodiode, excite a phototransistor whose output is inherently limited to a voltage no higher than the chip can accept.

On the output side, applications may require generating signals suitable for controlling everything from legible displays to solenoid valves capable of applying the brakes on a 20,000-ton train. Direct output of the micro components is at TTL (transistor-to-transistor logic) levels (+5 v./ground) which won't travel reliably more than a few feet in the presence of the electrically noisy environments typical of railroad conditions. Likewise, multiple-conductor costs for transmitting bits in parallel off the bus would rapidly outweigh speed and processing benefits as distance increases.

Myriad components are available to amplify, isolate and condition these raw outputs. Even more important are the standardized format and signal level conventions for transmission of data within and beyond the boundaries of the computer package, usually executable in the form of a single chip package. Two frequently encountered examples are;

UAR/T The universal asynchronous receive/transit scheme, by generating a short series of data pulses at 1/16th of its clock rate, assures that the message is interpreted at the receive end before its unsynchronized clock can wander enough to cause a bit error. It works up to at least 19.2 kilobaud (19,200 bits/second).

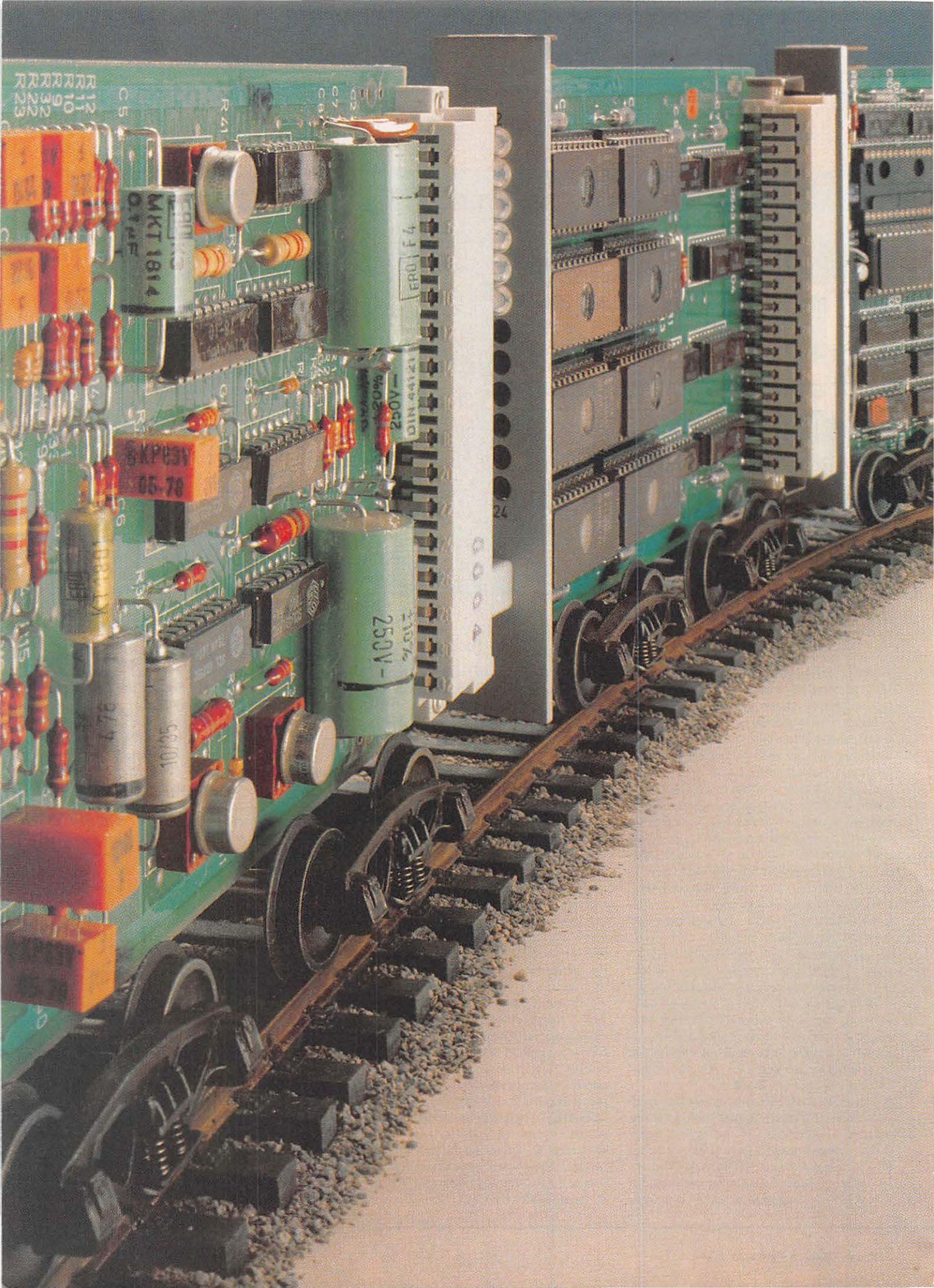
RS-232 This communication protocol transmits at much more noise-resistant + and − 12-volt levels and includes "handshaking" interchanges between terminals to insure that data is sent only when the receiver is ready.

• **Wrapping it up.** Deciding how to package the microcomputer is a matter for fine engineering judgment. The ultimate in processing speed for a given "architecture" of program and processing capability has to be the computer on a chip, since it has the shortest electron paths. It should also be the most reliable—once manufacturing technology is perfected—since any physical board or component interconnection is a potential trouble spot. It is also most likely to become a throwaway if requirements change or technology for accomplishing some key function makes a spectacular advance.

The single-board computer (SBC) category includes hundreds of commercial products of widely varying size and capability, based on a far smaller number of microprocessors. Bottom-of-the-line models (still with the impressive computational capabilities of their CPU) trade inflexibility (no place to plug in additional memory, for example) for compactness, economy (in the $200 range) and concentration on those aspects of ruggedness or performance useful in specific applications; the largest can accommodate whatever features may be needed—large memories or high-powered auxiliary processing, for example—along with those processing advantages of short bus paths.

In applications such as CTC office/field communication, inventory and maintenance advantages of accommodating all system functions with combinations using a minimum variety of plug-in modules may favor an entirely different distribution of components among boards.

Many functions can be performed either with hardware (a separate chip formatting an output, for example) or with software (by programming the computer). In general doing as much as possible with software—the basic idea behind going to a micro in any application where versatility is important—is cheaper, but a little hardware in many situations may allow a less powerful micro to keep up with the job, so the designer has trade-offs to make here as well.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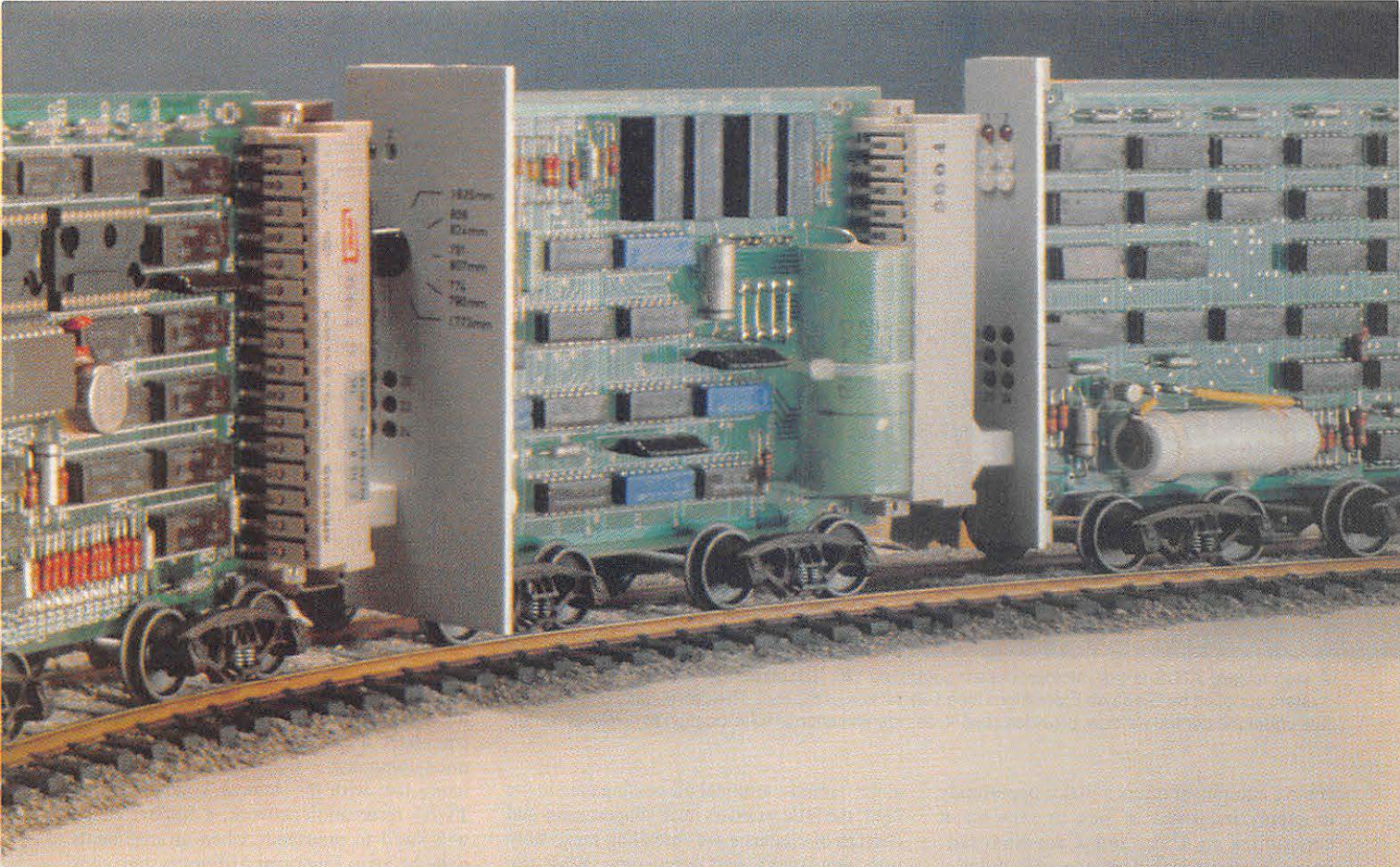


Train of thoughts

Control. Control under climatic extremes and control under any traffic load. SEL microprocessor components and modules give you that control to keep your stock rolling safely, efficiently and on schedule.

They're designed for incorporation into any type of remote control system from high volume light transit to mixed commercial long haul systems.

SEL single printed circuit boards, serial interface cards, relay cards, opto isolator cards and operating elements are some of the same ones in use in our well known SELTRAC train control system.

They are all modular in design so that the same standard design can be used for dispatch applications and on board and wayside signalling systems.

This means that you can design your own totally new system or upgrade an existing one using the absolute minimum of component designs. Standardized components result in savings on manufacturing systems development, maintenance servicing and future expansion of a system.

Also, because an individual component may be used in such a wide variety of applications, SEL has had to set performance standards to meet the harshest environments. Each and every component has been performance tested to withstand 30 G forces and a temperature range of −40 degrees to 70 degrees C.

That durability is a feature throughout any SEL based system.

If you need more than the basic hardware to do the job, SEL can help you there too, with expert systems design services and the full technological resources of ITT.

SEL—now that's the way to run a railroad.

SEL Components

SEL Canada ITT

SEL Canada, a Division of ITT Industries of Canada Ltd.
5075 Yonge St., Toronto, Ont., Canada M2N 6C6 /(416) 223-8611

Write in 41 on Reader Service Card

A step toward ATCS is the microprocessor-controlled LIC (Location, Identification and Control) system supplied by Glenayre Electronics for a subdivision of BC Rail. The cab display unit, located just under the central window, provides continuous identification of train location to ¼ mile or better.

control equipment offers a major opportunity to supply industries as well as very major economies to U.S. and Canadian railways...revenues would be at least an order of magnitude grater than those from the progressive increase in ctc that would result from the increase in traffic. Replacement generates much more business than extension, and new markets will open up where ctc could not be justified," summarized Detmold.

Estimates of the potential for operational savings to propel the forward leap? Not at all firm, pending the systems engineering which should better define how new and old capabilities can be fitted and work together. For its own situation, at least $100 million in annual savings could be identified, according to CN Chief of Transportation J.A. Reoch, "without any attempt to estimate the revenue implications of enhanced ability to compete with other modes on the basis of price and service improvement. That may prove to be the largest benefit of all."

Just what is this microtechnology that promises such macro benefits?

• **The old and the new.** Throughout the railway world, mainframe computers continue to whirr in their air-conditioned palaces; thousands of mechanical timers tick away in interlockers; many, many trains still must run (and, frequently, wait) on the basis of orders picked up miles previousiy; expensive talent is tied up riding locomotives looking for intermittent glitches. But promising to engulf or eliminate these and many other large or small pieces of the past in moving the traffic are newer and newer generations of those already commonplace, chip-endowed microprocessors and microcomputers.

Whether in the form of a dedicated mirocomputer chip performing its complex operations and self-checks buried inside a vital time-delay relay or of a more visible standalone "smart" terminal processing data in the field, the little wonders in all shapes, sizes and degrees of elegance are spreading inexorably into new tasks and locations. Why the growth? For one thing, today's microprocessor/microcomputer technology *does* reflect the distillation of an array of fundamental advances in logic, organization and packaging to complement silicon-substrate microcircuitry itself. A few of those most important to units in the size/capability range currently moving most rapidly into new or broader railroad applications are discussed in the box on pp. 40-41.

IBM is only now closing down the last of its nine punch-card manufacturing plants, completing a phase-out begun in the late 1960's. Railroad freight data was one of the items already being processed from Hollerith cards by the end of the 19th century, while U.S. Treasury checks (now switching to magnetically-coded paper) became the last mainstay of this format for computer data entry.

"This industry has been stood on its ear in the last couple of years" is a typical assessment of those who have grown up in the management information system business, expressed in this case by Amtrak Computer Services Vice President George E. Gautney. From the beginning, the gospel was that adding processing capability by upgrading or expanding the organization's central computer—accepting such painful side effects as connecting, time-sharing and arguing about the allocation of remote terminals—was the only reasonably economical way to go.

Capabilities of minicomputers (very crudely, cabinet-size rather than room-size jobs which you could look at for $100K and up) expanded to encompass such jobs as automating classification yards and their car-data processing with little if any real-time help from the mainframe monster at system headquarters, but for data processing in general there was still no real contest. The bigger the machine, the lower the cost per crunched number.

Suddenly, the microcomputer reversed things. The IBM System 360 mainframe, advertised in 1968 at an unprecedentedly low price in the $3,000,000 range, provided 64K bytes of accessible memory for its CPU. That is the same RAM capacity now provided in the complete, bottom-of-the-line but rugged and reliable, "personal business" or "desktop" computer, CRT monitor and disk drives included, that you can take home for $1,500 or so without even haggling.

A railroad like Amtrak, however, with its requirement for massive accessible memory in its systemwide reservation center in Philadelphia, must continue to have a big mainframe installation. Microcomputer "intelligent terminal" capabilities in its nationwide ticket offices are not essential in its present operating system (though they were vital during the changeover to new central hardware completed a couple of years ago). Scores of microcomputers in travel agencies are already interactive with the Amtrak system through TWA's reservation network, a number which will swell to thousands when arrangements with the giant American Airlines system goes into effect.

For *analysis* of all sorts of operational, marketing and engineering data, however—work which in the not so distant past would have had to be done as a series of batch jobs on somebody's mainframe somewhere—Amtrak now relies on a half-dozen micros of basic or augmented personal-computer size, located right where the studies are being made and the results put to use.

• **Research data: Speeding the flow.** Of potential long-term importance to better railroading far beyond the number of people directly involved is the generation of a solid base of research data for the use of suppliers and operators. What the desk-top computer is doing in reducing lost motion here can only be fully appreciated by someone who has lived through the stone, bronze and iron ages of field and lab testing and analysis.

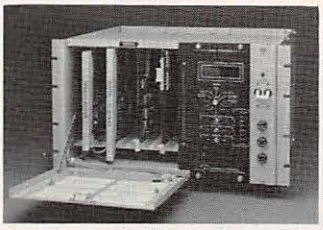
As the Transportation Test Center at Pueblo was developing in the late 1970's, its state-of-the-art facilities included a central data-processing facility based on a large computer into which data seemingly funneled endlessly, to emerge months later (if at all) as hardware and programs were gradually installed and debugged. Test cars with the best available minicomputers had similar, if smaller-scale, problems in supporting quick-look analyses timely enough for effectively guiding expensive test programs.

In a recent series of tests instrumented by TTC people on the road in Kansas, the microcomputer procesing the data rode in the locomotive cab, taking up little more space than the brakeman's seat. A 16-bit "hot rod" but still perhaps a tenth or so the cost of a typical predecessor test-car computer, it not only

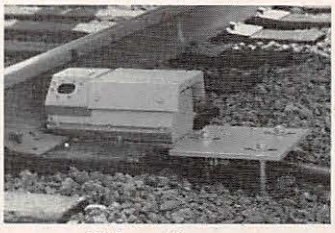
OUR TRACK RECORD SPEAKS FOR ITSELF

HOT BOX DETECTORS BY HARMON ELECTRONICS

For years Harmon has been a leading supplier of a complete line of highway crossing signal equipment, traffic control systems, railroad radio systems, high/wide load detectors, dragging equipment detectors, and train inspection stations.



Hot Box Detector Processor Talker



Universal Scanner

Harmon Electronics entered the field of hot box detectors in 1981, through the acquisition of design, patent, and manufacturing rights for the General Electric Company hot box detector system. In parallel with the marketing, manufacturing and servicing of that system we have invested in the design and development of a new microprocessor-based, state-of-the-art hot box detector, with features heretofore not available.

Customer response to these systems has been most gratifying and we appreciate the vote of confidence by railroads throughout the country.

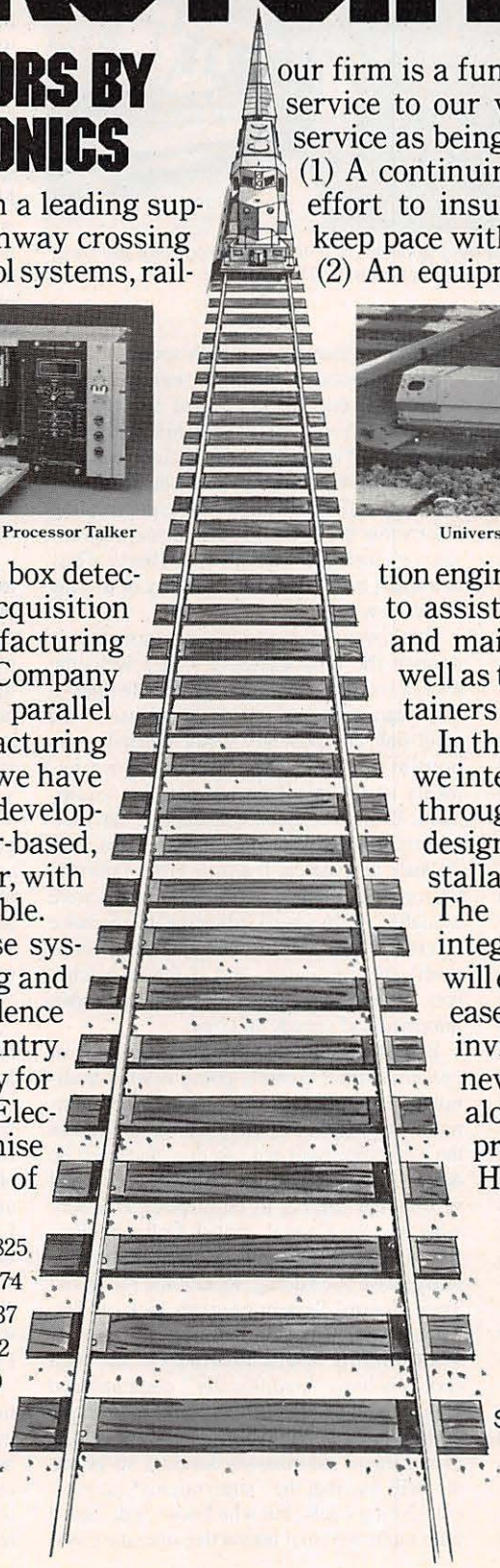
As a supplier to the industry for more than 35 years, Harmon Electronics is dedicated to the premise that the continued growth of our firm is a function of how well we provide service to our valued customers. We define service as being:

(1) A continuing research and development effort to insure that our product designs keep pace with the latest technology.

(2) An equipment modernization program to provide manufacturing facilities capable of producing hardware at least cost.

(3) A nationwide network of field service, application engineering and account managers, to assist customers with installation and maintenance of our products as well as the training of customer maintainers and technicians.

In the hot box detector marketplace we intend to offer a viable alternative, through the marketing of a system designed to reduce acquisition, installation and maintenance costs. The incorporation of automatic integrity testing and diagnostics will enhance product reliability and ease the task of the maintainer. We invite inquiries concerning our new hot box detector, new standalone talker or other Harmon products. Contact the nearest Harmon sales representative.



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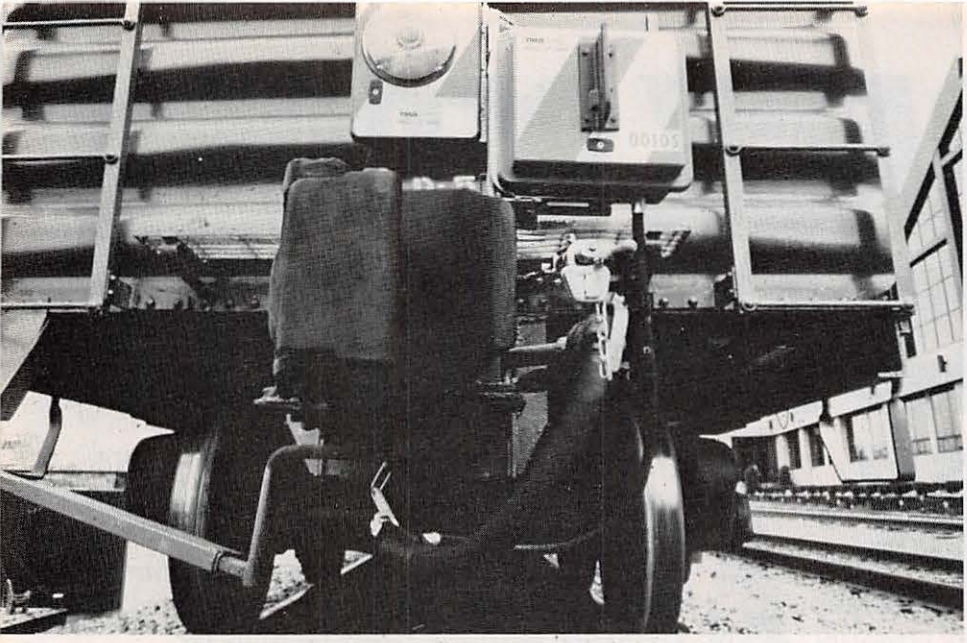


As cabooses disappear, an increasingly-widespread application of the microprocessor will be in end-of-train monitors. Pictured is Union Switch & Signal's new Trail Guard.

could display processed data to verify the functioning of all sensor systems *during* coast-down runs but present results as segment-by-segment train drag, in Davis-equation form corrected for acceleration and the effect of grade on each car of the consist, within two minutes afterward.

Back at the base, the same microcomputers perform the test control functions essential in Rail Dynamic Lab stability, structural response and locomotive characterization tests. Test controller Mark Dembosky modestly credits recent advances in commercially-available signal conditioners and other front-end "smart boxes"—themselves microprocessor-laden—for TTC's ability to switch instrumentation for a test in short order, and delays in other aspects of the R&D process of course remain, but data processing no longer need be the big one.

• Toward instant communications. Efficient railroading depends almost as much on good communication as good roadway drainage—if everyone connected with the enterprise, from m/w to sales, has *all* the information needed *all* the time, track machinery can stay at work until actual train arrival, cars go where they should on the first try, and customers are aware of what the railroad can do for them. Continuously interconnecting all the parts of such an inherently spread-out system with its mobile components is most flexibly done with a radio link somewhere in the system—and availability at all needed times and places of an assigned frequently in a technically suitable band is, and seems likely to continue to be, a nervously iffy thing.

At this point the *distributed* processing capability represented by the microprocessor comes to the fore, with "intelligent" terminals in agency offices, in the locomotive cab, and—maybe, if that will help, right in the trainman's hand as he picks up and sets out cars (*RA*, April 1984, p. 40)—conserving on-the-air time by doing a lot of processing locally before exchanging the minimum essential information bits with the dispatcher or system MIS computer at high speed.

Microprocessor-enhanced wayside defect detectors if not now connected directly to a central monitoring station are shifting to automatic radio "talker" communication with the train crew—but this still must be interfaced with train radio traffic in the area, interrupting it for some time. Could such formatted messages go instead via a high-speed burst of bits to a smart box in the cab for replay or display to the crew?

Other ways of transmitting information—through the rails themselves as a welcome alternative to weather-vulnerable pole lines—have also come into widespread use, with solid-state componentry vastly enhancing the process and microprocessor-based refinements likely in all next-generation equipment. Computer-aided dispatching, far from rare these days, can optimize meets a long distance in advance. If a *little* better information on train progress between OS points were available, train speed adjustments to make "perfect" minimum-energy meets could readily be calculated, and if the dispatcher was not too busy, he could keep the crews informed and speeds on target...

But why not look at the whole business of *optimized* train control, going beyond traditional signaling practices, to see what communication and computational capabilities in the microprocessor era can do—and *must* be doing if opportunities to improve service and save money are not to be missed? Precisely what Algoma Central, British Columbia Ry., BN, CN, CP, NS and Seaboard representatives have been doing. Result: the Advanced Train Control System program kick-off discussed previously.

• Unlimited applications? On the high end, functions "traditionally" computerized with generation after generation of mainframe equipment—accounting, analysis, audit, management information services in general—will find that the "supermicros" (at present 32-bit models, but who knows?) designed with multi-terminal interactive operating systems in mind (e.g. Bell's UNIX) will further confuse the picture as to just what constitutes "mainframe" territory. Prices for such mega-capacity "micros" build back into the $300K range, but unit terminal support costs are still headed downward.

On the small end of the spectrum, the microprocessor becomes a candidate for control and logic functions otherwise handled by mechanical, electromechanical, discrete-component or integrated-circuit solid-state electronic sub-systems—clockwork, relays, transistors, IC's. The microprocessor is not only endowed with that cachet of modernism attractive to advertising copy-writers but with solid, expanding and increasingly critical technical credentials as well: versatility, blinding speed, and *operating principles far more compatible with what they're teaching in school these days* than good but old relay logic. In competition with less versatile component or discrete IC logic accomplishing one or a few functions equally well, however, the microcomputer must overcome some basic "overhead" complexity and pay for its programming.

End-of-train monitoring for cabooseless operation with identifiable radio reporting to the locomotive cab is not only an obvious high-growth area at the moment but one where the programmable micro is a natural.

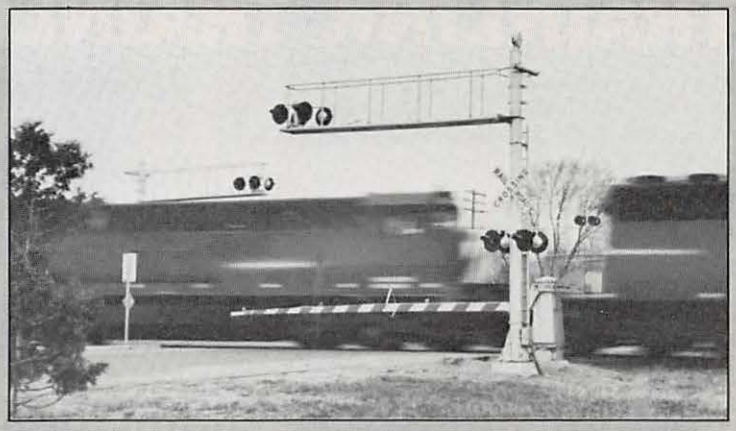
Emilio Fernandez, president of Pulse Electronics, considers a detailed engineering/manufacturing design analysis specifically considering discrete IC, MSI/LSI and microprocessor alternatives an essential step following any marketing study that establishes performance requirements and cost targets for a promising new item. One of those innovators (including some "traditional" C&S suppliers along with some other small high-tech shops and railroad labs) characterized by good track records in developing items that carve out solid places in the market, Pulse introduced its Locomotive Power Monitor in March 1983 with solid state component logic, switching to a microprocessor with the beginning of production of functionally-identical "Phase II" units later in the year.

Pulse's LPM monitors for abnormal unit loading while providing a routine read-out of accumulated horsepower, with all the diagnostic and operational data-comparison possibilities implied; for a continuous look, it can be fed into a Pulse magnetic train data recorder (which plays back into a microprocessor analyzer but needs no micro itself). With the LPM microprocessor aboard to control things, a few wayside low-power radio readout stations (in field test but not yet in production) should allow a railroad to keep tabs on locomotive performance systemwide while the LPM's flag any individual-unit problems.

With a full base of other railroad applications beyond C&S, including everything from inventory, machine tool and even m/w equipment control in sight, microprocessors of course won't actually take over hauling trains—except, come to think of it, they *are* regulating locomotive adhesion. Amazing! ■

MEETING THE CHALLENGE

MOTION SENSORS



The Challenge:

Develop a new breed of motion sensor system that has greater immunity to DC coded track circuits and electrical interference, that sets up quickly and positively, offers maximum operating distance...

...and sets a new standard for competitive pricing.

The Solution:

Safetran Model 590 Motion Sensor Systems. All you've wanted in advanced technology, high security, long range operation and simplicity. With a variety of systems and options to meet a wide range of applications...

...and a new standard for competitive pricing.

More than 20 years experience in electronic crossing warning systems has gone into the design of Safetran's new Model 590 Motion Sensor Systems. The result brings to you what you need most.

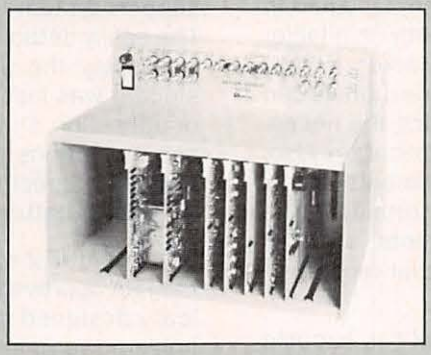
Simplicity

Clean design permits simple, quick, positive set-up of a Model 590 system. Two lights indicate when it is properly matched to track and ballast conditions. Frequency slaving allows conservation of frequencies as two Model 590 units share the same frequency at multiple track crossings. Slaving is as simple as connecting a wire between the units.

Changing only a single module gives the Model 590 remote operation capability for greater flexibility in difficult applications.

High Security

The Model 590 has improved immunity to noise from DC coded track, power lines and other electrically noisy environments. It has many internal safety check circuits, including a self-check



system and built-in surge protection for both track and battery inputs.

Memory lights indicate abnormal track characteristics and remain flashing to alert maintenance personnel to intermittent problems.

Longer Range

Safetran Model 590 systems have the industry's lowest frequencies. By coupling low frequency with linearization, Model 590 systems achieve maximum operating distance while maintaining broken rail detection.

Cost Effective Systems

The basic Model 590 Motion Sensor System has been combined with a variety of accessories to provide cost-effective packages for most applications. Both single and dual systems are available for use in non-signaled and track circuit territory, with or without overlapping audio frequency approach circuits.

And these systems are available at a surprisingly competitive price.

Turnkey Installation

All Safetran Motion Sensor Systems are available on a turnkey basis, which can include complete system design, engineering and installation by Transportation Engineering Services Company —TESCO—a Safetran subsidiary.

There's More

Contact us for more information about the Model 590 Motion Sensor Systems. We have the systems, the price and the capability to fill all your crossing system needs.

Safetran meets the challenge.

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MEMBER RPI

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TRAINLINK™

The advent of cabooseless train operations led Pulse Electronics Inc. to the development of **TRAINLINK™**, an End-of-Train telemetry package specifically designed for the range of environmental conditions encountered in North American freight service.

In order to accommodate the varying requirements of different railroads, **TRAINLINK™** has been designed in modular form. Three models are currently available: Radio Telemetry with Highly Visible Marker (HVM), Radio Telemetry only, and HVM only. These models can be reconfigured in the field, thus affording the necessary flexibility to customize a specific application. Also, depending on railroad operating requirements, a mix of different types can be used while retaining the advantages of many common components, such as batteries and their chargers, and potential reconfiguration if the operating needs change.

The fully expanded version of **TRAINLINK™** is capable of sending the following information to the Head-End:

- Brake Pipe Pressure
- Last Car Motion
- Highly Visible Marker Status
- Battery Status

The Head-End package displays all the information sent by the telemetry unit, and in addition it displays (if equipped with the optional odometer feature) distance traveled by the train since the last reset issued by the engineman.

In order to eliminate the guesswork associated with the handling of batteries, Pulse has developed a battery support system for the rear unit called **SMARTPACK™**. The easily detachable battery pack provides the means to display the approximate amount of charge used since it was last recharged and the approximate age, or utilization, since it was first placed in service. These two indications provide the necessary information to formulate specific operating instructions to recharge and scrap battery packs.

Both the UHF 2 watt FCC type approved transmitter and the FRA approved HVM drive circuitry have been specifically designed for efficient operation in order to minimize power consumption and stretch battery support time.

TRAINLINK™ is the result of over 10 years of EOT telemetry experience. It combines Pulse's research efforts in train instrumentation and strobe (HVM) development. It is a product truly designed from the "ground up" to meet a new and challenging railroad application.

TRAINLINK™ TRAINLINK™ TRAINLINK™

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THE WINNING HAND...

The stakes are high when you specify electronic products for railroads. You don't have to ***fold*** if you hold the right cards. When you consider the people who design and build the products you need, it's clear that the combined railroad experience at Pulse always represents The Winning Hand.

Pulse is a leading supplier of electronic equipment engineered by individuals with many years of railroad experience. We know the unique problems found in this rugged operating environment. We never compromise with the performance a product must deliver to function under these conditions.

The Pulse approach to the design and manufacture of solid state devices removes the risk in specifying equipment. We know the quirks that can develop when you introduce electronic equipment into the demanding freight train environment. We listen first, then we design, test, and test again, until we're satisfied. Why? Because we're familiar with your problems. We've been there—we're railroad people.*

Pick a winner and choose the company with the ***proven track record in railroad electronics*** . . . think about it.

* *Wayne Ayers*—*Soo Line*
Ray Bailor—*Amtrak*
Bob Clevenger—*Santa Fe*
Emilio Fernandez—*Southern*
Dick Fisher—*Norfolk Southern*
Mark Kane—*Conrail*
Jim Shockley—*Southern*

PULSE
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MEMBER RPI

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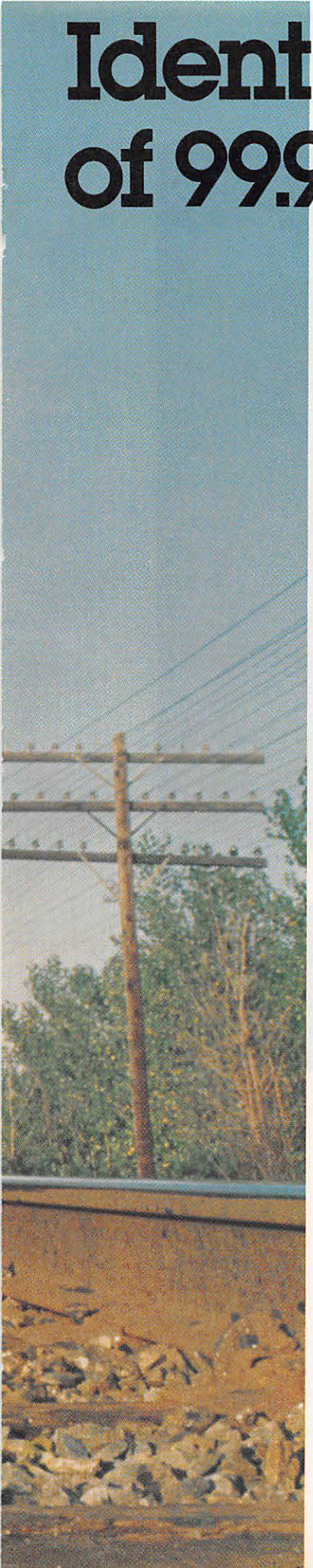
The GRS With Tested Accuracy

Identifier.™ of 99.9%, It's Ready.



GRS is ready for nationwide ACI.
The question is, are you?

Nationwide automatic car identification is coming. Sure, there are questions still to be answered and obstacles yet to be hurdled. But the biggest challenge—an accurate, reliable identification system—has been overcome.

In the Identifier from GRS.

The Identifier is ready for service with documented test results behind it. Results that show an accuracy of 99.9%* over thousands of cars at the AAR test facility in Pueblo, Colorado.

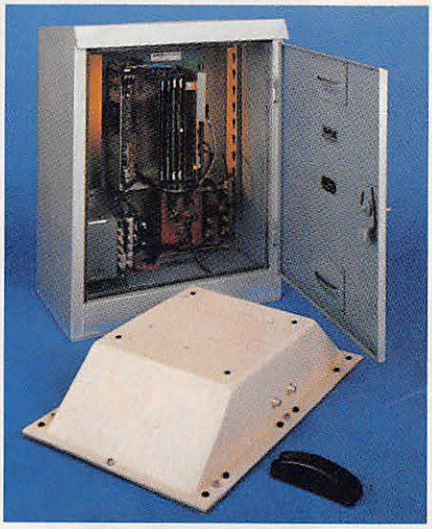
ACI or no ACI, the Identifier offers you immediate benefits.

At GRS, we're testing the Identifier under actual working conditions with mainline railroads and rapid transit operations in the U.S. and Canada.

These tests verify what we've known all along: The Identifier offers you immediate management benefits you can't afford to ignore—independent of those of nationwide ACI.

You get real-time, automated data entry into your existing computer systems for faster information transfer and greater accuracy in these and other applications:

- ☐ Locomotive operations and maintenance management.
- ☐ OS reporting.
- ☐ Captive-fleet ACI.
- ☐ Fuel allocation reporting.
- ☐ Intermodal fleet tracking.



***TEST RESULTS**

Accuracy of 99.9% is based on reading 55,129 tags at AAR Pueblo test site, September 12-October 28, 1983. Test data available upon request. These results in no way constitute an endorsement of the GRS Identifier by the AAR.

The Identifier is a fully integrated system, offering one-of-a-kind features that make car and locomotive identification not only workable but practical:

Permanently coded, field-programmable tags require no batteries. Selectable code tags. A reader that interfaces with your computer, or outputs a fully formatted report directly to your printer. And much more.

Of course, you'll also get the experience and assistance you've come to expect from GRS.

The Identifier from GRS. You don't have to wait for nationwide ACI to profit from it right now.

Contact your GRS sales engineer. He'll show you how the Identifier works and what it can do for you.

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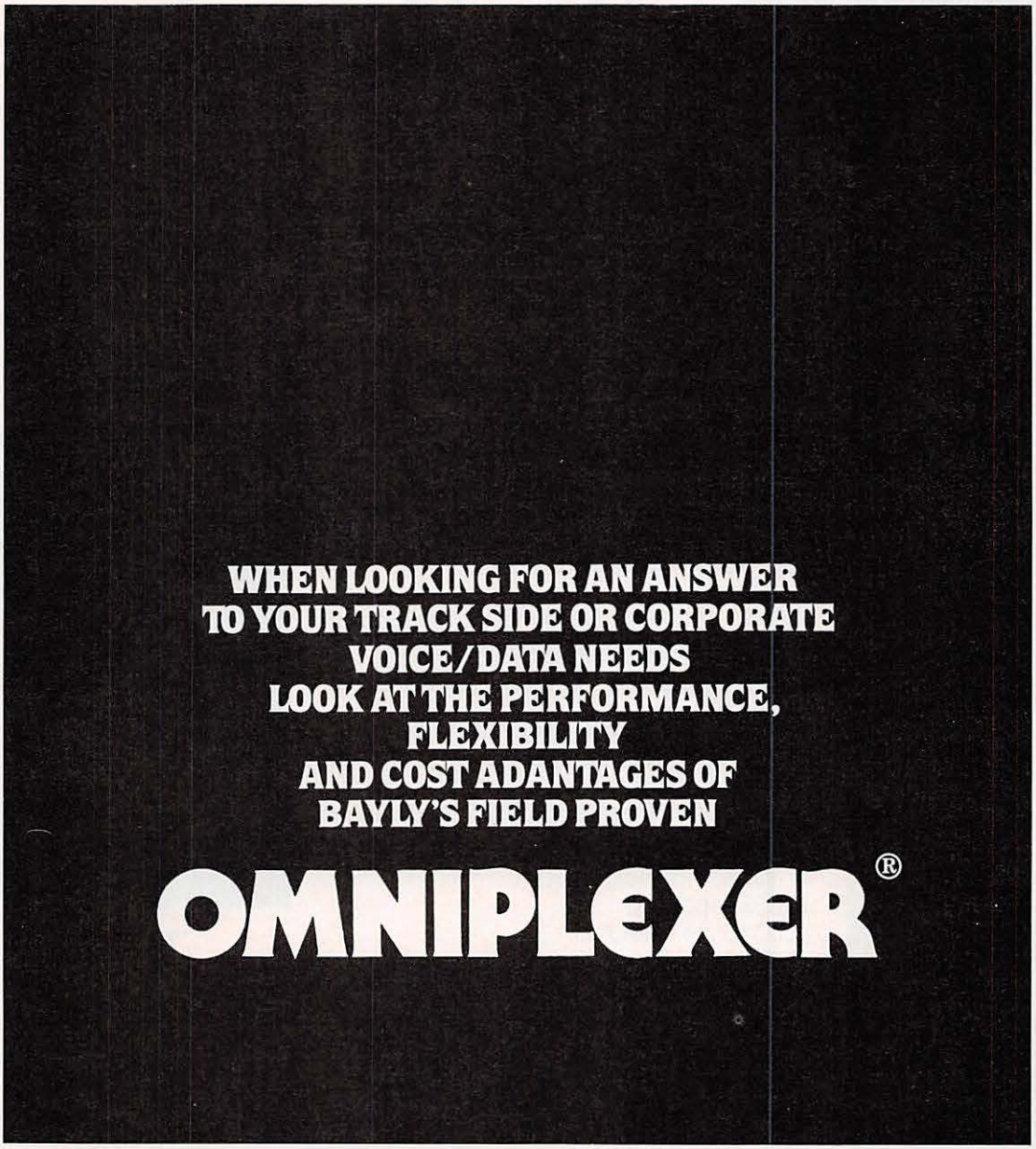
TECHNOLOGY IN MOTION.

GRS
GENERAL RAILWAY SIGNAL
A UNIT OF GENERAL SIGNAL
ROCHESTER, NEW YORK 14692

3779



See the Bayly
T1 Omniplexer on display at the 1984
A.A.R. show
Boston Park Plaza Hotel
Boston, Mass.
August 19-22, 1984
Booth #81

Bayly

Bayly Engineering Limited. A member of the AEG Telefunken Group. 167 Hunt Street, Ajax, Ontario, Canada L1S 1P6

When you consider performance, flexibility and cost...the answer to your voice/data needs is Bayly's field proven T1 Omniplexer.

- Optimum Data Efficiency (288 Data Channels x 2.4 kb/s per T1
- Full Compatibility with Telco T1 Lines
- Low Cost: Gives you OMNI quick pay-back
- Any Mixture of Voice and Data with 100% T1 Fill
- Two Years Field-Proven Operation
- Reliability: Redundant common equipment
- Simple Operation
- System Expansion: To full T1 capacity

Data: .150 to 19.2 kb/s individually selectable and 56 kb/s with test and operational features.

Built in RS232C and V:35 Interfaces

Synchronous, Asynchronous and Isochronous

Voice: Filter Enhanced (FE) 32 kb/s (48 channels) Toll Quality 64 kb/s (24 channels)

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670103

LASERLINK 8000/13000 has been specifically designed to provide a reliable method of transmitting repeaterless fiberoptic broadband analog signals over short, long or extreme distances.

LASERLINK 8000/13000 TRANSMITTER

Utilizing the General Optronics laser diode as its light source, LASERLINK's transmitter provides bandwidth from 7 to 250 MHz. An Automatic Gain Control drives the laser at a level factory-preset for maximum signal power and low distortion of better than −35 db. Optimum laser drive is maintained with an input signal from −20 to 0 dbm. The AGC may be defeated to lower the laser drive level when desired.

A pilot tone controls the receiver AGC. Simultaneously transmitted, it is set 15-20 db below the data level at any frequency less than 7 MHz, precluding distortion or interference with the transmitted data. The transmitter is protected from overmodulation in all modes (with or without AGC activation), preventing damage to the laser.

The system fits the standard Tektronix 500 series mainframe. Front panel LEDs show the status of internal power supplies and indicate peak limit to reveal that drive level is sufficient for optimal laser drive. The front panel also contains a warning light to indicate emitter degradation, and a switch that activates the AGC function or manual gain control to adjust the laser drive level.

LASERLINK 8000/13000 RECEIVER

Specifically designed for long or short haul analog fiberoptic links, the LASERLINK 13000 features the GO PIN—FET in the receiver front end, while LASERLINK 8000 uses the GO-APD module. Both units offer broad spectral response as well as wide bandwidth. Each unit may be operated in an automatic gain mode where the output level is kept constant, or in a manual mode where the output level is controlled by the gain control on the front panel.

The pilot transmitted by the 8000/13000 Series transmitters controls the AGC. The absolute amplitude of the pilot tone at the receiver indicates the link loss. The receiver automatically adjusts the gain as a function of the received pilot level, so that link integrity is maintained even when no data is transmitted. Should the transmitted data be in a burst mode, the system will not change, thereby eliminating distortion normally caused by AGC slewing.

The front panel of the receiver contains monitors for internal power supplies, a signal strength meter, and a manual gain control. The front panel also contains a switch to engage or disengage the AGC circuitry.

KEY FEATURES

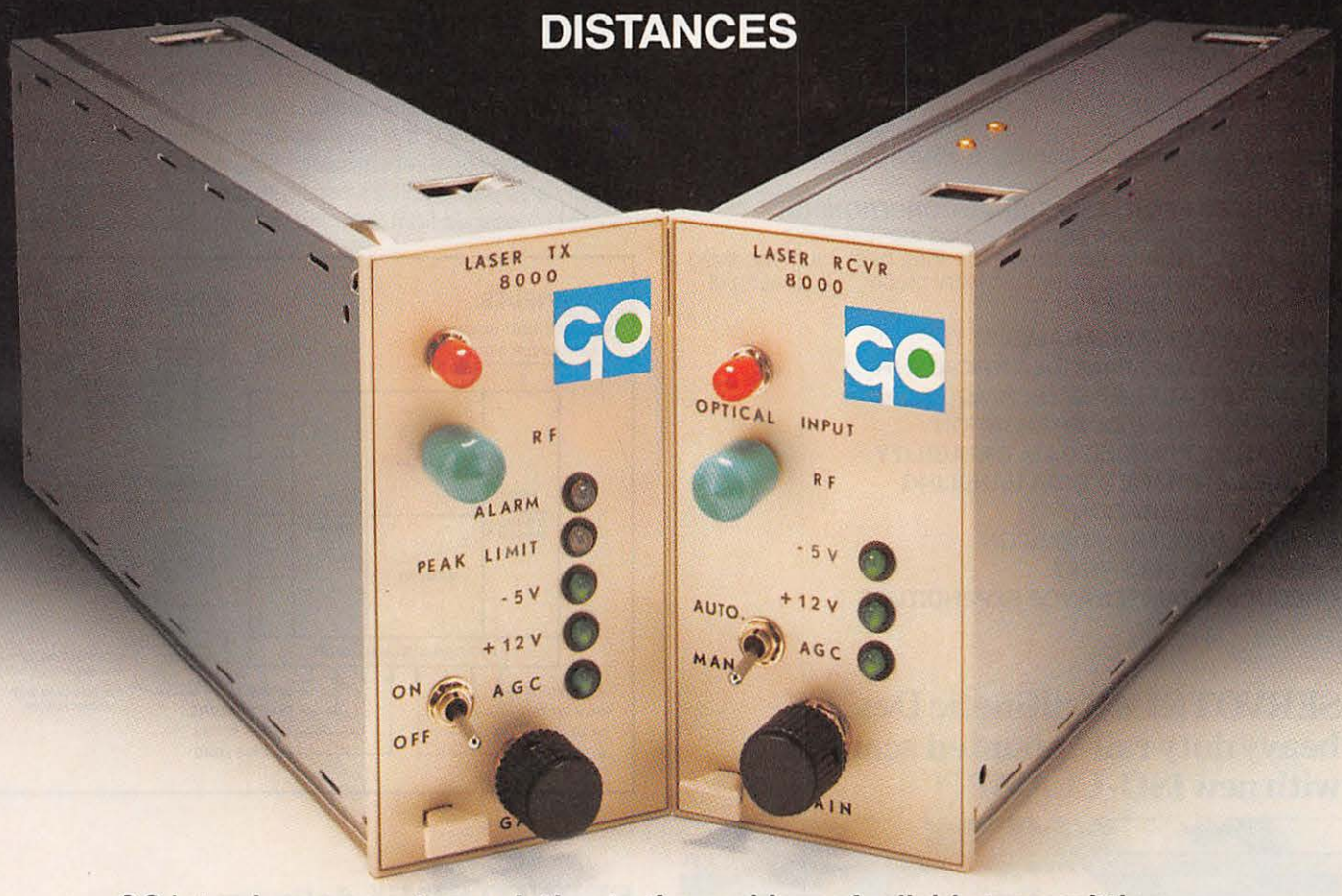
- Wide RF Bandwidth — High Link Loss Budget
- Automatic Gain Control or Manual Override
- Pilot Carrier Controlled AGC
- Link Integrity Independent of Data Transmission
- Signal Strength Monitor
- Peak Limit Indicator
- Overmodulation Laser Protection
- Performance Warning Alarm

general optronics corp.

Two Olsen Avenue, Edison, New Jersey 08820
Tel. (201) 549-9000 • TWX 710-997-9556

GO LASERLINK 8000/13000 WIDE BAND ANALOG FIBEROPTIC TRANSMISSION SYSTEMS

OPTIMIZED FOR LOWEST NOISE, LOWEST DISTORTION OVER SHORT, LONG OR EXTREMELY LONG DISTANCES



GO introduces a system solution to the problem of reliably transmitting repeaterless fiberoptic broadband analog signals over short, long or extreme distances. Applications include Multichannel High Quality Video, Voice, Data and Satellite IF Communications. Single or Multi Mode, 850, 1300 and 1500 nm.

For more information about GO Fiber Optic and Atmosphere Lightwave Communications Systems call Joe Affatato, Marketing Manager, Electro-Optical System Division.

general optronics corp.

Two Olsen Avenue, Edison, New Jersey 08820
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Model 9909

SERVOTRIM™ Hot Box Detective® TRain Inspection Monitor™

A Major Technological Advance for Faster, More Accurate Detection With an Absolute Minimum Risk of False Alarms.

SERVOTRIM™ "Electronic Hindsight" memory solves detection problems

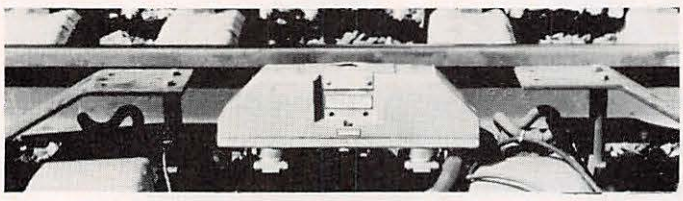
Now, through the use of solid state digital data storage which allows instant recall and precise reassessment analysis, SERVOTRIM takes a giant leap forward in the solution of many technical problems and operational obstacles which have always presented a difficult challenge to hot box detectors.

Unlike other hot box detectors which essentially operate in "real time," SERVOTRIM analyzes train data which has been stored in digital memory. This permits the data from one journal, for example, to be compared against many factors, some of which become known only after the entire train has been scanned. With the inherent power of memory-based circuits, SERVOTRIM combines real time and post-train analysis to obtain speed and accuracy.

The net result is an exclusive combination of important design and performance features, available only with SERVOTRIM:

- **IMPROVED FRONT END SIGNAL CONDITIONING:** Speed-adaptive noise filtering; Transducer threshold adjustment; Uniform sampling of bearing heat data; Improved car bottom reference; Automatic recalibration; Elimination of ambient temperature effects.
- **IMPROVED SIGNAL ANALYSIS**
- **ENHANCED BEARING IDENTIFICATION**
- **SUPERIOR ALARMING TECHNIQUES**
- **SWIRLING SNOW COMPENSATION**
- **GREATLY EXPANDED DATA CAPABILITY**
- **ALARM STORAGE & DATA HANDLING**
- **BATTERY OPERATION**
- **DIGITAL DATA TRANSMISSION**
- **AUTOMATIC SELF-TEST**
- **REDUCED MAINTENANCE EXPENDITURE**

SERVOTRIM™ "Kinetic Design" heavy duty rail-mounted scanner with new ISO-CLAMP™



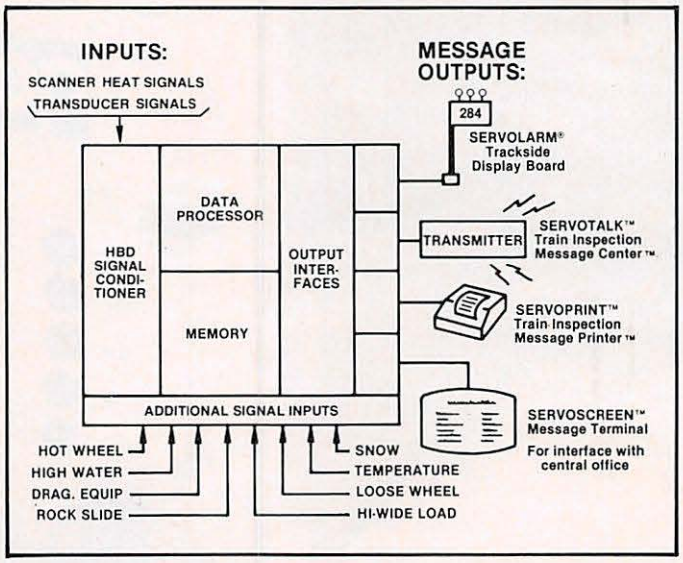
- **Engineered for heavier train loads,** to meet severe environmental requirements.
- **Handles faster train speeds,** up to 180 MPH.
- **Compatible with all types of bearings,** employing "universal" scan technique to operate with roller, plain and new inboard type bearings.
- **ISO-CLAMP mounting,** substantially reduces shock/vibration input to the scanner; isolates scanner from lightning and rail-induced transients; permits rail cant correction to the scan line.

SERVOTRIM™ is a fully-integrated, highly versatile train inspection system

In addition to hot box detection, SERVOTRIM™ is designed to function as a consolidated defect detection and alarm readout system, interfacing with other Servo detectors such as the SERVOTHERM® Hot Wheel Detective® – plus additional trackside detectors for dragging equipment, loose wheels, snow, high water, rock slide, ambient temperature, etc.

Still greater versatility is added by the industry's widest choice of readout systems including: SERVOTALK™ Train Inspection Message Center; SERVOSCREEN™ CRT Message Terminal for central office analysis; SERVOPRINT™ Train Inspection Message Printer for permanent hard-copy record; and SERVOLARM® Trackside Display Board.

The SERVOTRIM™ memory allows all data messages to be stored for recall or retransmission, either locally or remotely. This memory also provides the flexibility to store, process and transmit messages from adjacent intermediate detector sites.



SERVOTRIM™ delivers added useful information

Train information not previously available can now be provided quickly and easily, such as: train speed, length, train count, car count, axle count, direction, location, time, date, and ambient temperature.

SERVOTRIM™ is actually the beginning of a new era in train information for increased railroad efficiency and profitability. Its inherent capacity and versatility will, in the near future, allow the interfacing of even more detector inputs, with more outputs, for integration with advanced central office functions, and other requirements of future railroad operations – in effect, a total train information management concept!

Now appearing on main lines everywhere....

SUCCESS STORY

Starring SERVOTRIM™, The Computerized Hot Box Detector

SEE US AT THE
AAR/C&S SHOW
Boston, Aug. 19-22
Servo Booths 11-14

Our new Model 9909 SERVOTRIM™ Hot Box Detective® TRain Inspection Monitor is receiving top reviews for its field performance from the most demanding C&S Engineers of major railroads across the U.S. and Canada. SERVOTRIM is the first and only complete memory-based microprocessor HBD, the latest major technological advance from Servo, world leader in state-of-the-art HBD systems since 1956.

In terms of design and performance, SERVOTRIM is clearly in a class by itself. Here are just a few of its many sophisticated-yet-practical features:

- **"Electronic Hindsight" memory storage of data**
- **Accommodates a wide choice of other detector inputs**
- **Improved front end signal conditioning**
- **Automatic bearing identification**
- **Automatic self-test**
- **Automatic re-calibration**
- **Improved car bottom reference**

The end result is faster, more accurate detection – to keep your trains on the rail, without hot box burnoffs – and to keep your trains on schedule, without unnecessary stops for false hot box alarms! If that's what you need on your railroad, then you need SERVOTRIM. Call or write today for a private presentation of "THE SERVOTRIM SUCCESS STORY."

servo

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MEMBER RPI RAILWAY PROGRESS INSTITUTE

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Evolution of Electronic Signal Control Units

It has been over 10 years since Electro Pneumatic first introduced Electro Code to the railroad industry. Since that time, the widespread use of discrete, solid state DC coded track circuits has played a significant role in shaping today's signaling practices.

A new product's acceptance by the railroad industry has always been based on the long-established criterion of careful and deliberate testing and evaluation over a period of time. This is due, primarily, to the importance of the signal system — to the efficient operation of the railroad, and the emphasis and verification of safety that is essential when transporting either people or sensitive material.

While the introduction of microprocessors into the electronic signal control systems is not "revolutionary" compared to other industries, the infusion of this technology has to take into account the factors and equipment that have evolved into the current state of the art.

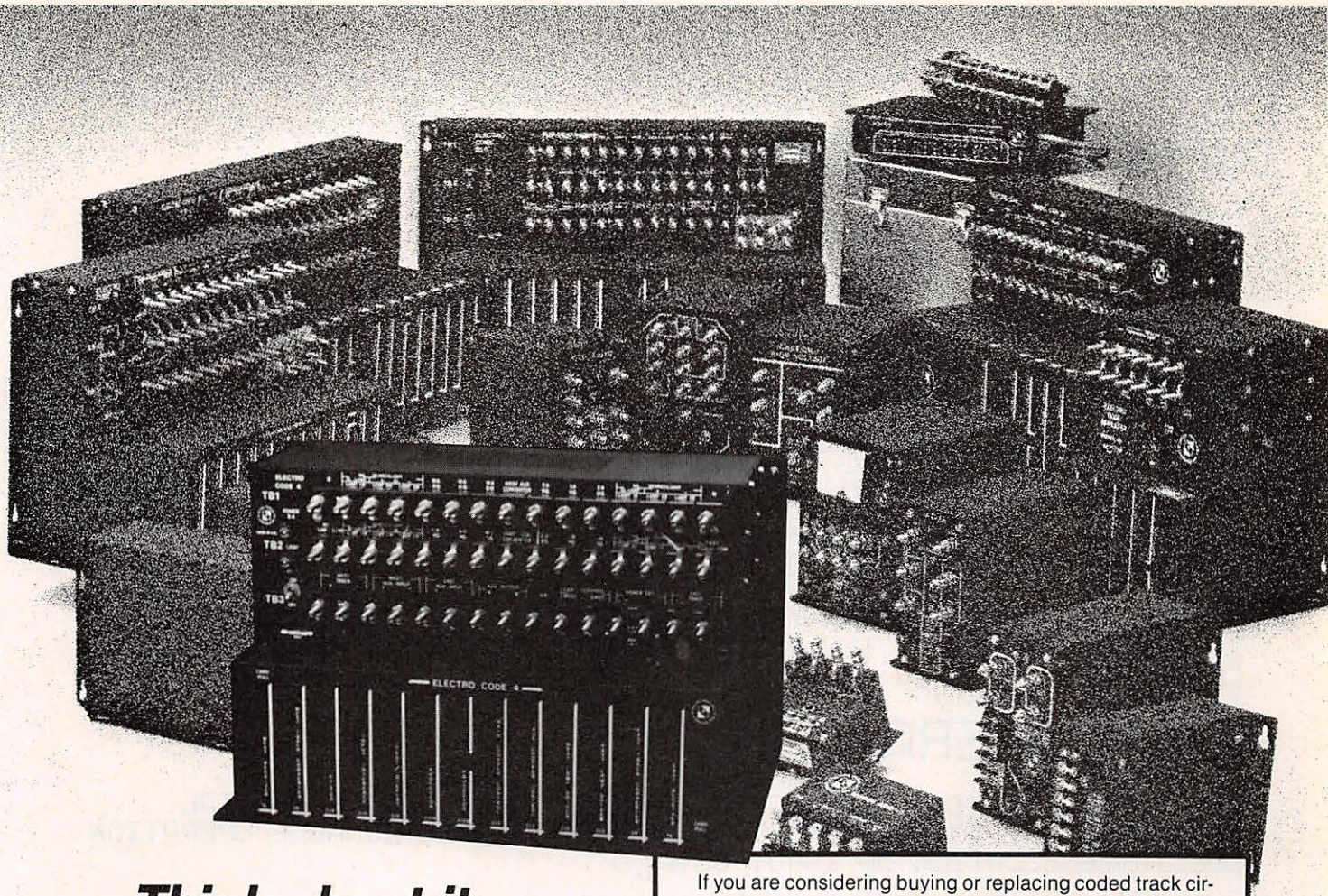
In developing Electro Code 4, several preliminary criteria had to be met — any "new" piece of equipment had to be compatible with both existing equipment and track circuits. Additionally, the new equipment had to "pass the test" for reliability and safety that is fundamental to this family of products.

With these guidelines established, Electro Pneumatic Corporation set out to design, manufacture and field test the Electro Code 4. Several performance goals were established — notably, the realization of cost savings to the user, by being able to control signals in both directions through one "package." This, of course, would reduce the cost of Electro Code, and as a side benefit, permit the use of smaller enclosures to house the equipment.

Secondarily, the Electro Code 4 was made even more cost effective by being designed to operate signal lamps directly, without relays and vital signal components. A side benefit of this technique is the ability to downgrade the signal to a more restrictive display in the event of an open filament.

Since the EC-4 uses two microprocessors which are configured in a "handshake" arrangement, the measuring and processing of information and events can be executed quickly, with a high degree of reliability and, most important, complete safety. Therefore, upgrading signal output is a continuous process. Furthermore, Electro Code no longer has to rely on relays for vital signal control.

While the acceptance of this technology is well founded, the testing of such devices is ongoing in an effort to validate the faith that the industry has placed in this equipment.



Think about it —

The New ELECTRO CODE 4 could save you more than money...

When we set out to design the Electro Code 4, we wanted to do more than produce a simple technical update of the Electro Code III—we wanted a new system that would:

1. be compatible with our existing equipment,
2. save budget dollars for signaling departments,
3. have greater signal control capability than anything on the market,
4. meet the standards for signal system reliability that EPC has established.

When you think about it, you'll make the move to the Electro Code 4.

ELECTRO PNEUMATIC CORPORATION — E P C

Keeping Signal Control on Track

If you are considering buying or replacing coded track circuit equipment, take this simple test and think about the time, maintenance dollars, and labor you can save.

Electro Code 4	Others	
YES		Is the new system compatible with equipment already in the field?
YES		Is the track circuit design a proven product?
YES		Is the equipment capable of operating with solar charging equipment?
YES		Is the equipment compatible with Cab Signal systems?
YES		Can the unit operate with high levels of induction (60 Hz) in the track circuit?
YES		Does the system have direct control of double-head color lights and searchlight mechanisms—no interface relays required?
YES		Do equipment failures result in downgraded signal displays as opposed to a total shut-down?
YES		Is only one unit required at an intermediate signal location?
YES		Can the unit illuminate up to six 20-watt lamps without additional equipment?
YES		Does the unit have compatibility with motion measuring equipment used as crossing warning devices?
YES		Can the unit drive all color lights up to 28 watts, and operate any searchlight mechanism having a coil resistance greater than 200 ohms, plus provide a "stuck mechanism" check?
YES		Does the unit have directional stick logic?
YES		Does the unit have two microprocessors to assure system safety and maximize train movement despite adverse field conditions?
NO		Is the equipment difficult to install? (In fact, you can use smaller cases with the Electro Code 4.)

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IMPROVED DETECTION

UPDATE YOUR DETECTOR WITH OUR FIELD-PROVEN MA1 MICROPROCESSOR BASED AUTOMATED VOICE DEFECT DETECTOR.

INTERFACE WITH ANY EXISTING HOT BOX SCANNER SYSTEM WITHOUT ADDITIONAL EXTERNAL HARDWARE.

IMPROVED HEAT ANALYSIS

UNDER SOFTWARE CONTROL, YEILDING CAR-SIDE AND/OR TRAIN-SIDE STATISTICAL EVALUATIONS WITH DIGITAL ALARM LEVELS FIELD ADJUSTABLE.

SYSTEM DIAGNOSTICS

RESULT IN MINUMUM GUARANTEED STANDARDS OF PREFORMANCE. AIDS IN TROUBLE OR FAULT ISOLATION. SYSTEM FAULTS ARE PRINTED ON LOCAL PRINTER.

SAFER OPERATION

DUE TO QUALITATIVE TESTING OF VARIOUS INPUT DATA FOR VITAL LIMITS AS WELL AS MISSING DATA. PREVENTS QUESTIONABLE OPERATION DUE TO DEGREDATION OF INPUT DATA.

LESS MAINTENANCE

DUE TO ALL SOILD STATE AND INTEGRATED CIRCUIT MICROLOGIC CONSTRUCTION. EXTENSIVE LIGHTNING PROTECTION DESIGN.

DIGITIZED HUMAN VOICE

STORED IN EPROM MEMORY. NO MOVING PARTS REQUIRED. NATURAL TAPE QUALITY SOUNDING VOCALIZATION.

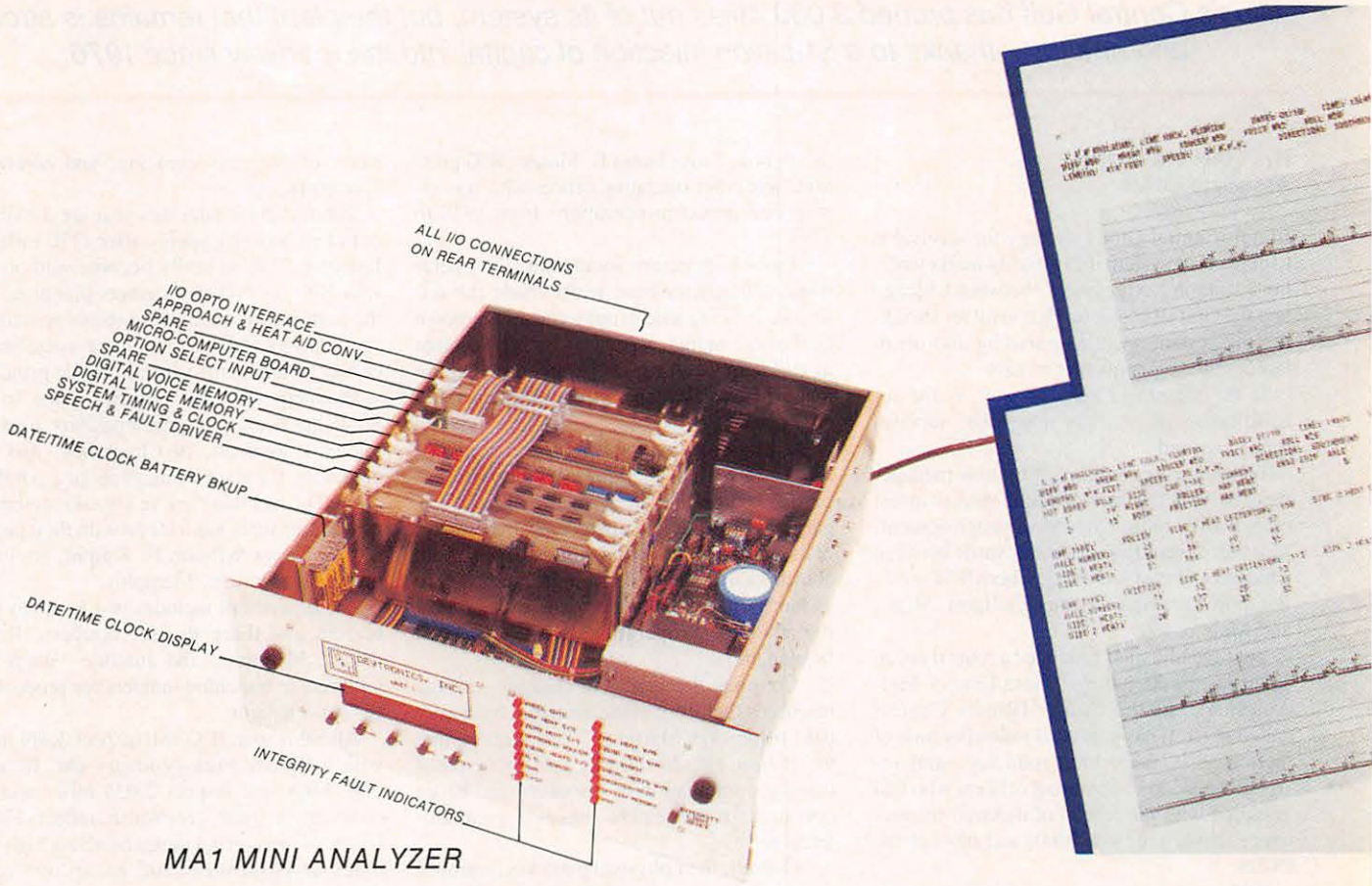
HISTORICAL RECORDS

FOR EACH TRAIN. A SUMMARY PRINTOUT ON 80 COLUMN PRINTER WHICH IS SUPPLIED WITH EACH SYSTEM. INFORMATION SUCH AS DATE/TIME, LOCATION, SPEED, LENGTH, TOTAL AXLE COUNT, DIRECTION, DEFECTS AS OCCURED, ALARM SWITCH SETTINGS, AND ALARM CRITERIA ARE PRINTED FOR EACH TRAIN.

COST EFFECTIVE

YOU GET MORE >>> WITH LESS WORK <<< FOR FEWER DOLLARS INVESTED

IS YOUR HOT BOX DETECTOR "SPEECHLESS"



MA1 MINI ANALYZER

DEVTRONICS, INNOVATOR IN TALKING HOT BOX DEFECT DETECTION EQUIPMENT.

THE WORLD'S FIRST MICROPROCESSOR-BASED AUTOMATED VOICE DEFECT DETECTOR WAS DESIGNED, DEVELOPED AND INSTALLED BY DEVTRONICS, INC. IN MARCH 1978 FOR THE SEABOARD COAST LINE RAILROAD AT NEWNAN, FLORIDA. SINCE THEN, DEVTRONICS HAS DEDICATED ITSELF TO IMPROVING AND EXPANDING ITS RAILROAD DEFECT DETECTION EQUIPMENT LINE. WE HAVE BEEN WORKING WITH THE MICROPROCESSOR APPLICATION LONGER THAN ANY OTHER MANUFACTURER IN THE WORLD AND HAVE A TRACK RECORD OF FIELD-PROVEN EQUIPMENT USED BY RAILROADS THROUGHOUT THE UNITED STATES.

OTHER PRODUCTS AVAILABLE

UT1 MICROTALKER: STANDALONE DRAGGING EQUIPMENT, HIGHLOAD, AND WIDELOAD ENUNCIATOR.

MT1 & MT2 MINITALKER: UPGRADE HOT BOX DETECTOR UTILIZING EXISTING ALARM PANEL.

DEVTRONICS, INC.
1571 MAIN STREET
ATLANTIC BEACH, FLORIDA 32233
PHONE: (904) 241-3281

FOR YOUR SPECIFIC REQUIREMENTS CONTACT OUR OFFICE

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ICG cuts back, shapes up

Illinois Central Gulf has pruned 2,000 miles out of its system, but the plant that remains is strong and healthy—thanks to a $1-billion injection of capital into the roadway since 1976.

By FRANK MALONE,
Associate Editor

Illinois Central Gulf's strategy for survival is to convert its system into a highly marketable, high-volume "expressway" between Chicago and the Gulf of Mexico. That involves shrinking the system—while upgrading and maintaining the segments that remain.

If the shrinkage goes as well as the rehabilitation of roadway has gone, survival seems assured.

Following a commitment by new management in 1976, the railroad found ways to invest more than $1 billion in roadway improvement. Most of it went into lines and yards between Chicago and the Gulf coast, where ICG serves Baton Rouge, New Orleans, Gulfport, Miss., and Mobile.

That spending has produced a route that can again justify the name, "Main Line of Mid-America," as the former Illinois Central called itself. It has produced mile after mile of meticulously manicured roadway—and restored the pride of operating officers who had grappled with the results of deferred maintenance through the late 1960s and most of the 1970s.

"What we have now is efficient capacity," says James E. Johnson, manager of ICG's midwest division at Champaign, Ill. "We handled higher volume before, but we floundered in it. What one crew can now do in eight hours might have taken two crews 12 hours."

"This railroad is in better shape than it ever was, even when we had section gangs all over the roadway," says James A. Paul, transportation superintendent, southern division, Jackson, Miss.

"We don't have to apologize to anybody," says Jerry Bumpus, senior vice president-operations at Chicago. "Largely because of track conditions, our on-time performance has gone from about 15% in the middle '70s to more than 80% at present. And that's without any lengthening of schedules."

• **"Safe, on-time."** Bumpus says greater consistency has come despite a lowering of maximum speed of most freight trains to 40 mph, for more efficient use of fuel. Also, ICG is handling more ton-miles with fewer locomotives. That's due partly to continuing shrinkage of the system, but the main factor is faster turn time because of better track, says Bumpus.

"We're more comfortable knowing that the operation is going to be safe, smooth, and on-time, and we have more time to consider other things now," says James E. Martin, ICG president and chief operating officer who was senior vice president-operations from 1978 to 1983.

"From a monetary standpoint, the operational efficiencies have really made the difference in being able to put some money down on the bottom line, especially with the decline in carloadings. And our people now believe that we can make this railroad work, make it go."

Besides directing the bulk of the program, Martin directed an operating department reorganization that he believes had a big impact on rehabilitation. He reduced the number of divisions and gave division managers more control of mechanical and engineering as well as transportation functions. There was a similar change in operations management at headquarters.

"Coupling the structural changes with the resources that were made available has really paid off," says Martin. "The numbers that we've been able to show as a result are proof that the combination of resources and better operations management makes a great difference."

"Overall, their physical plant has improved drastically," says Joseph W. Walsh, FRA associate administrator for safety. "We've inspected the heck out of the ICG property and we haven't found many problems."

One thing FRA sees is a much-improved safety performance, with track-related train accidents showing a sharp decline in recent years. "They went 27 months without a fatality, and that's almost unbelievable for a Class I railroad," says Walsh.

• **Less mileage, bigger budgets.** Contributing to the turnaround were capital outlays for roadway improvement that averaged $147 million a year from 1977 through 1982, after a 1976 expenditure of $63.2 million. During the same period, ICG shed about 2,000 miles of track.

The 1977-82 spending covered 879 miles of new continuous welded rail, 603 miles of second-hand cwr, 8.5 million new ties, 122,230 carloads of new ballast, and 24,996 track miles of surfacing.

Last year, the engineering capital budget totaled $51.1 million for the 6,700-mile system. This year, the budget is set at $60.6 million, as shrinkage of the plant continues toward a maximum size of 5,000 miles.

The 1984 program includes 60 miles of continuous welded rail (used), 37 turnouts, 685,000 ties, 16,000 cars of ballast for 2,500 miles of program surfacing, and additional spot surfacing.

Scheduled for later this year are 320 miles of rail grinding by Speno, after a 120-mile test last year. "We've really become sold on it," says Billy G. Sykes, engineer-planning. "In the past, we went too long without grinding," says Charles P. Davis, engineer-maintenance of way, stressing the value of profile grinding.

Productivity? One surfacing gang in the South has become almost legendary. Consisting of a foreman, two trackmen, and five operators, the team averages about 2.5 miles a day. "The fact that they've stayed together for nearly four years has a lot do with their performance," says William H. Knight, engineering superintendent, Memphis.

The equipment includes two Kershaw regulators and three Plasser tampers (Roadmaster, Mainliner, and Junior). "We're big believers in bunching tampers for productivity," says Knight.

Also this year, ICG will inspect 2,414 miles with a Plasser track-geometry car. In addition, FRA will inspect 2,024 miles with its own vehicle. That, says Walsh, reflects FRA's policy of monitoring routes handling high volumes of passengers and hazardous commodities.

• **The federal factor.** FRA also wants to see how the railroad is maintaining segments rehabilitated with preference-share financing provided by the 4R Act. ICG is required to preserve the quality achieved with the aid of $152,530,000 in 30-year, 2.3% financing.

The railroad took advantage of the 4R money to rebuild some big-volume segments and one strategic terminal. Thus, the bulk of the borrowing went into segments between Chicago and Champaign, Edgewood, Ill., and Fulton, Ky., and Memphis and Jackson.

On the double-track main between Chicago and Champaign, volume last year ranged from 32 to 38 million tons, and this line also handles six Amtrak trains a day. On the Edgewood-Fulton segment, which parallels the double-track main in southern Illinois, volume ranged up to 33 million tons, for the highest level on a single-track ICG line. And volume reached 28 million tons on the Memphis-Jackson segment, which parallels another single-track main that handles passenger and piggyback trains.

Though representing only about 10% of the ultimate investment in the main line, the 4R funding was significant as an early catalyst. "It helped to turn us around, and it allowed a lot of rail cascading for programs funded by

ICG main line in southern Illinois. This year's roadway plans include 60 miles of cwr, 37 turnouts, 685,000 ties, 16,000 cars of ballast, 2,500 miles of surfacing, 320 miles of rail grinding, and extensive inspections. Frank Malone

Illinois Central Gulf," says Johnson.

Improvements funded with preference-share financing included 477 miles of new welded rail, 68 miles of second hand cwr, 529 turnouts, 427,029 crossties, 22,525 switch ties, 342 miles of surfacing with 7,082 cars of ballast, and 3,836 feet of bridges.

In some 4R areas, the railroad added its own funds to round out the projects, accounting for 18 miles of new cwr, 61,000 crossties, and 607 feet of bridges. The railroad also funded 276 miles of ballast undercutting in addition to 85 miles under 4R funds.

"There are other ways to treat ballast, but undercutting was the best choice for the conditions we faced," says Davis. "We could not have rehabilitated our main line without undercutting." ICG used two Plasser machines, since sold.

Also under 4R, the Jackson terminal underwent rehabilitation valued at more than $15 million. Ranking third in volume after Markham (Chicago) and Memphis, Jackson has grown rapidly in strategic importance to ICG. It handles 45 to 55 trains a day.

Besides the two main lines from Memphis, Jackson's responsibilities include traffic from the double-track main originating in New Orleans. Feeding that line are two routes from the petrochemical "gold coast" that extends to Baton Rouge. Further traffic comes from the Meridian-Shreveport line through Jackson, a route that has been a steady grower. And terminating there is a line that handles traffic to Gulfport and Mobile.

• **"A new beginning."** Jackson is now a bustling southern hub for a sleekening north-south system that, so far, hasn't become slim enough to attract a serious suitor from within the rail industry. But ICG has become strong enough to make parent IC Industries somewhat subdued in its sales pitch for a former albatross.

The railroad's 1984 financial outlook is excellent, after two strong quarters. The longer-term outlook is improving as more tonnage moves over a smaller system. More and more, officers talk of survival as an independent somewhat smaller than the former Illinois Central but basically resembling it.

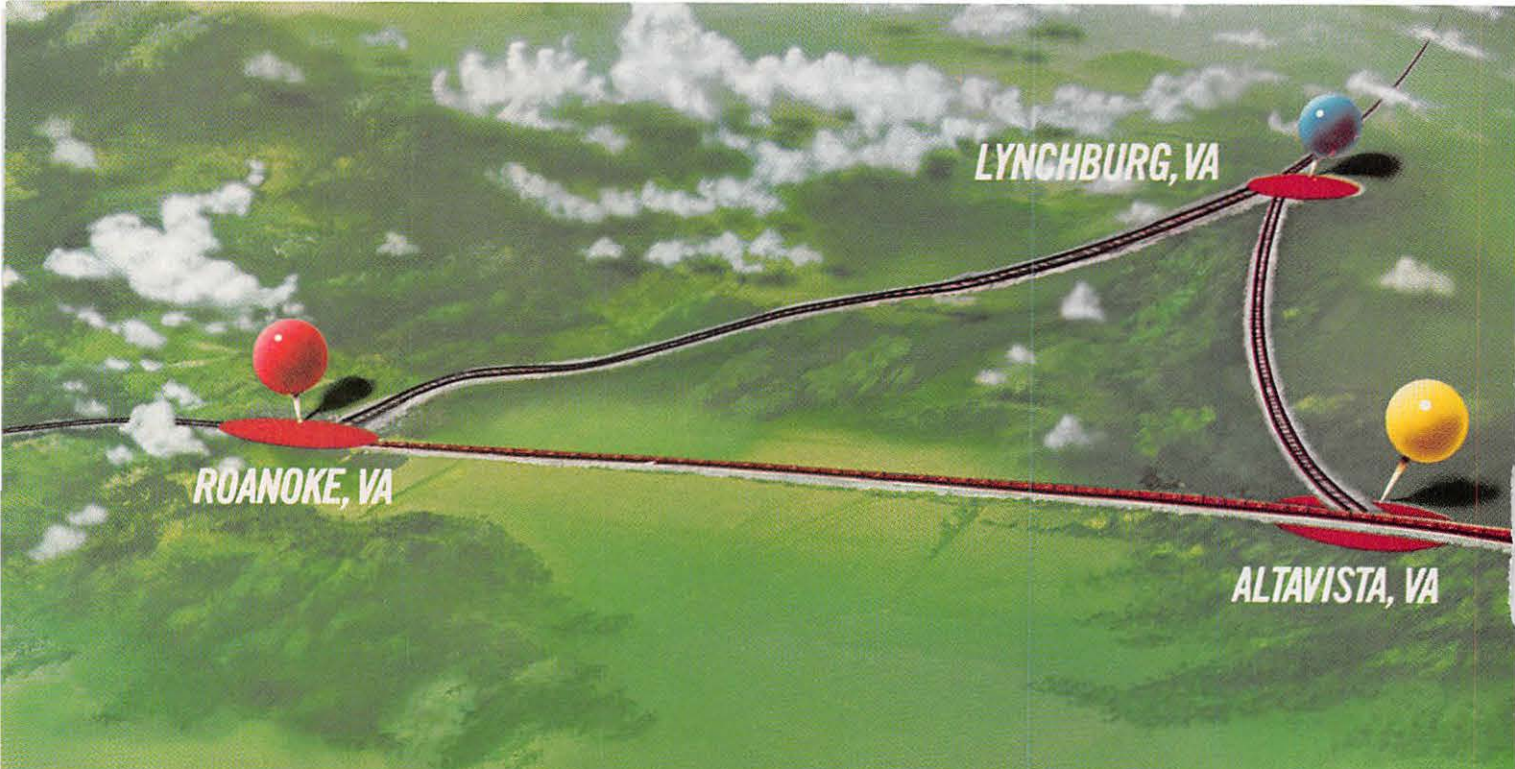
"We realize," says Harry J. Bruce, ICG chairman, "that our long-term future probably lies best in an association with another railroad, perhaps as part of one of the super-railroads that are now emerging from the series of mega-mergers of the last few years.

"But until that kind of transaction can be accomplished, we'll follow the plan which is now producing very positive results and enhancing our future potential."

Besides maintaining ICG as a "top-notch" railroad, other parts of the plan, according to Bruce, are to continue the program of line rationalization, and to strengthen the balance sheet, particularly by issuing long-term, fixed-rate debt. In fact, ICG in June completed a public offering of $150 million of first mortgage bonds due June 1, 1994.

The plan also involves further cost containment and attempts to eliminate "wasteful and expensive work practices," and pursuit of marketing innovations and contracts covering a wide range of commodities—while seeking 32-state authority for truck operations.

"We are making a new beginning for a great railroad," Bruce told Industries shareholders in May. "We're building a company that's responsive, innovative, and efficient. We will continue to make an important contribution to the transportation system of the United States for years to come." ■



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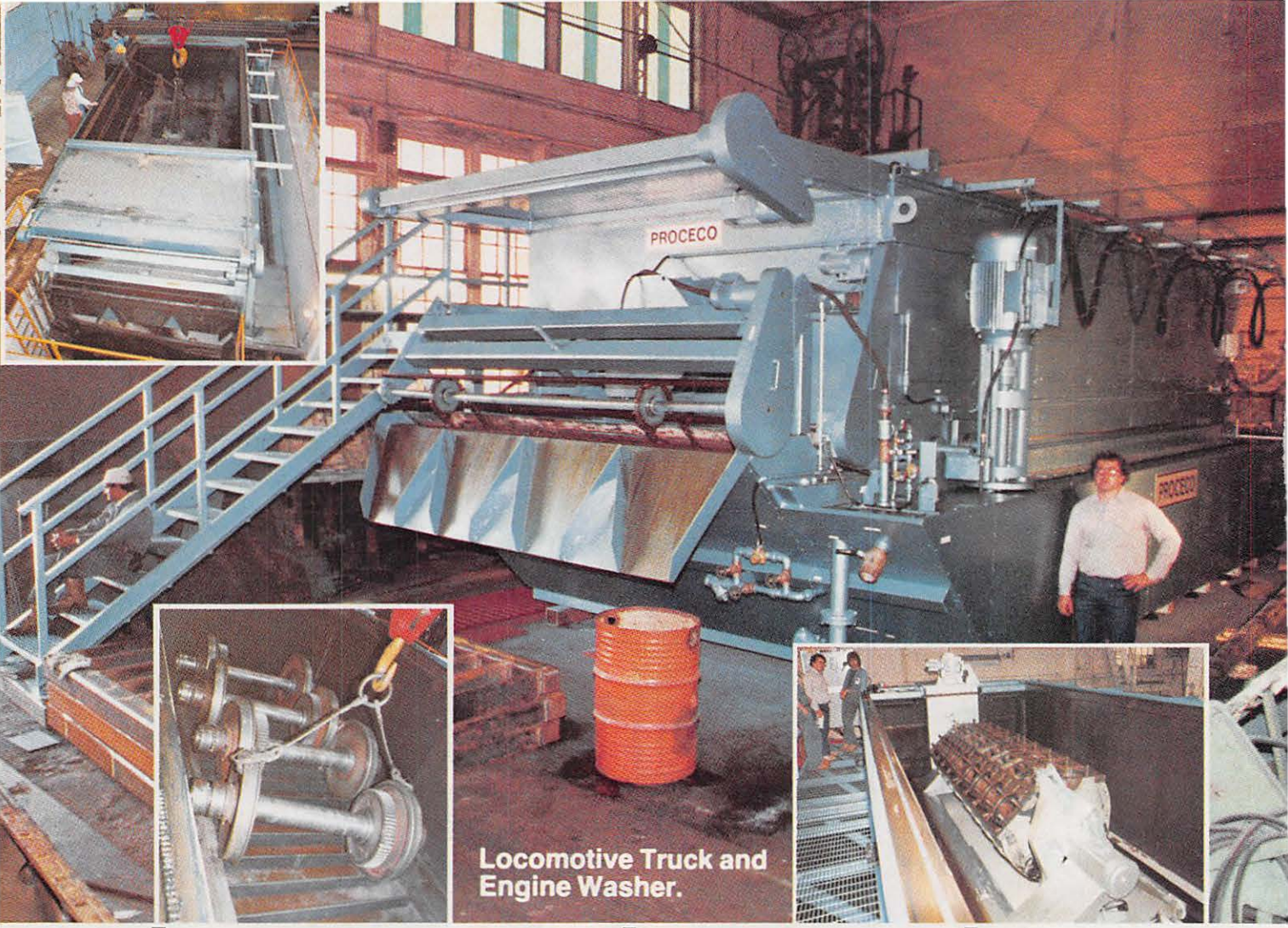

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The new, $40-million, 289,000-square-foot Jenks locomotive complex at North Little Rock was designed to provide the smoothest possible work flow.

MP's 21st century shop

Designed to service a fleet that will increase substantially by the year 2000, the new locomotive shop at North Little Rock is a model of ease of maintenance, energy efficiency, and aesthetics.

Downing B. Jenks retired as Missouri Pacific's chairman last year when MP merged with Union Pacific, but the railroad will have a Jenks complex for years to come.

That's because the rail industry's largest, most sophisticated facility for heavy repair of locomotives bears the name of the man who directed MP's transformation from weakling to mighty railroad.

Officially opened July 14, the $40-million facility at North Little Rock, Ark., represents the climax of an ambitious capital-improvement program that characterized Jenks's tenure as MP chief executive.

For Union Pacific System, the 289,000-square-foot complex represents an asset with more than three times the capacity of the nearby shops that it replaced.

While sheer size is a major factor, just as important for capacity is the compatibility of flow on the floor with overhead flow in the main building. Designers figured out how to allow no fewer than 35 cranes to move around fairly freely.

The main building can accommodate 34 locomotives at a time. A north-end transfer table reaches 30 tracks; and a south-end table reaches four shop tracks, 17 storage tracks, the run-around track, and the south shop lead. A rubber-tired car mover equipped with hi-rail attachments handles locomotive movements throughout the facility.

Outside, a paint building, a pre-wash building, and a load-test area lie in line across the north transfer table. The Jenks shop represents the third phase of modernization of North Little Rock diesel facilities that began in 1968 with construction of a servicing area. A light repair shop followed in 1971.

• **Designed for growth.** The new shop was designed to handle major repairs of locomotives and their components for an MP fleet expected to significantly increase by the year 2000. Current fleet size is about 1,500. The Electro-Motive Division of General Motors will start delivering 60 new SD-50 units this fall.

North Little Rock has the highest concentration of locomotives in a 24-hour period of any location on the system. The virtual MP epicenter also has an automated classification yard. From there, main lines spread out to Gulf ports, Dallas/Fort Worth, Kansas City and Chicago.

Besides providing a full range of repairs, the Jenks shop can handle locomotive remanufacture. In fact, says Michael L. Wall, MP chief mechanical officer, "we can almost build a locomotive from the ground up." Tentatively set for 1985 is a remanufacture program for four-axle units.

Planning of the facility was well along when UP and MP announced their intent to merge. "We started looking at how this facility would fit into the merged system," says Wall. "It certainly will be an asset." For the time being, however, North Little Rock is not likely to absorb much work from UP facilities such as the big Omaha shop.

MP planners justified the expenditures by demonstrating a significant rate of return on investment from absorption of work from less-efficient MP facilities. That included a heavy-repair facility at Fort Worth, but the major gains stem from savings right at North Little Rock.

There, the new facility replaces four buildings, three of which were built in 1904 for steam locomotives and converted to handle diesels in the 1950s. The fourth was a 30-year-old steel shed.

Overhead cranes covered just 35% of the old facility, and the transfer table was too short for efficient movement of diesel units. "It took a lot of jockeying to pass locomotives around," says Jack H. Sheridan, shop superintendent.

Flow was foremost in the minds of the new shop's planners, among them Mark A. Coles, MP facilities planning engineer. He says:

During the design of the new shop, MP employees studied a 1/87 scale model of the work area layouts and floor plan. Many of their suggestions were incorporated into the final design.

"We designed the process first, then we designed the building around it."

Primary evidence of that is the proliferation of cranes. Accounting for over $2 million of the building's cost, and ranging from a ¼-ton capacity underhung to a 250-ton capacity bridge crane, they're positioned so as to move with a fair amount of freedom from one another. "Rather than imposing a uniform crane system, we built it to fit the operation in all aspects," says Coles. "We strove for a compromise between overhead and floor movements. The best design for floor flow may be the worst for overhead."

Hand-held radios control the larger overhead cranes with the exception of the 250-ton crane. A radio in the cab of the car mover controls the transfer tables.

Says Wall: "This shop represents a major departure from similar facilities in that it utilizes an assembly line for certain types of locomotive repairs. This means the locomotives proceed from one station to another rather than the mechanics and material going to the locomotives."

• **A clean sweep.** Also contributing to the efficiency of the Jenks shop is a fresh focus on the cleaning of locomotives and components. "For once," says James D. Hope, MP superintendent-motive power, "cleaning is properly integrated in a locomotive facility. This resulted from something that we've learned the hard way, and that is that you can't work well on dirty components."

Readily agreeing is Sheridan, who says: "We have recognized the relation between cleaning and overall shop performance. It affects productiviy, efficiency, quality control, morale, and above all, safety."

That's why MP devoted about 7% of the shop investment to 12 separate and carefully-tailored cleaning operations. Two involve entire locomotives: an external "pre-wash" and a final pre-paint. A third is for entire locomotive frames.

The primary emphasis, however, is on cleaning of components, with washers for truck frames, gearcases, journal boxes, traction motors, engine blocks, small engine parts, injectors/governors, air compressors/compressor parts, and oil coolers.

Still coming is a washer for traction-motor frames that also will handle armatures, alternators and main generator frames. "In addition to cleaning components prior to maintenance, it will help to keep the shop clean," says Coles.

Supplier of the component washers was Canada's Proceco. The firm designed each machine for the type of components to be cleaned. A typical example is the truck frame washer capable of handling a 60,000 pound load.

• **Preventing bottlenecks.** Among other salient main-building elements are the following:

—A total of 48 carbon-arc or wire-feed welding machines spread throughout. "Instead of mobile units to be dragged around, we chose multi-process machines dedicated to work stations," says Roy B. Kolesa, MP welding supervisor. "We saw this as another way to prevent bottlenecks." Nor are there bottles of acetylene for cutting. Instead, workers use a high-pressure natural gas/oxygen system.

—A conservative application of automated, numerical-control machinery for tasks of heavy fabrication. "We put NC equipment only where we thought it would really pay off in repetitive operations," says Wall. "We were conservative in adapting these machines to the work, but we chose the most sophisticated where justified." A typical example is the use of a numerically controlled press brake programmed to bend the compound contours of locomotive snow plows and fuel tanks.

—Rugged floor finishes designed to withstand the handling and dropping of heavy objects. Claiming the toughest finish of the entire facility is the truck shop, which has a high-impact layer of metal shavings over concrete. Elsewhere, there's a granite-like trap-rock finish. Some sections have a floor of intermediate hardness.

—An air-circulation system designed for energy conservation and worker comfort through placement of ducts as low as possible to work areas, without blocking movement of materials.

—Pleasant aesthetics inside and outside. Coating the inner walls is a high-gloss enamel that is easy to maintain and brightly colored. The latter aspect, says Jack Kushner, MP architect, "will perhaps increase productivity by keeping workers alert." The exterior walls are an attractive combination of earth-toned pre-cast concrete panels, split face concrete block and metal panels. The metal panels have a factory-baked enamel finish; the structural steel of the pre-wash and paint buildings are located outside split faced concrete block walls to eliminate exposure to corrosion from chemicals used inside. "These buildings will not have to be repainted for a long time," says Kushner.

—A paint shop designed for high productivity with an automatic-mix system supplied by Graco. The system eliminates manual mixing and most manual drum-moving. It reduces waste by preparing only as much paint as programmed for a job. Sensors determine whether or not the system is receiving enough activator along with the paint. "For production painting, I think it's the best system available," says Wall.

—A 66,000-square-foot material distribution center located adjacent to the main building's west side. From the center, a wide delivery path runs through the shop from one side to the other. In the shop, main aisles are wide enough to allow two forklift trucks to pass, with room to spare.

—Sludge conveyor systems below the tracks in the pre-wash building, the paint building, and the frame-wash area of the main building that automatically collect solid waste and remove it from cleaning areas. Five of the Proceco washers also have self-contained sludge removal systems.

—Mezzanine and office areas of the main shop covering nearly another acre of space beyond the shop floor. Among the benefits are full overhead views for shop supervisors.

• **Employee input.** "It's hardly a stereotype railroad shop," says Duane R. Miedtke, executive project manager in the industrial design department of Ellerbe Associates, Inc. With previous railroad experience including design of Burlington Northern's big Alliance, Neb., shop, Ellerbe representatives worked with MP planners all the way.

Miedtke cites ease of maintenance, energy efficiency, and aesthetics as the shop's attributes, adding: "Throughout the design process, the people on the floor were MoPac's main concern." The facility is in full compliance with all EPA and OSHA regulations and has a generous amount of space for lunch and locker rooms.

During design, a 1/87 scale model was on display in the old shop. MP asked employees to study the model and many suggestions concerning work area layouts and the floor plan were incorporated in the final design.

Starting in 1981, an MP team toured locomotive shops of BN, Conrail, Santa Fe, CP Rail, and CN Rail. "Everybody was quite candid about their problems and about what they'd do differently if they could build a new shop," says Wall.

Then superintendent-motive power, Wall was part of the team headed by John G. German, then MP vice president-engineering and now president of a railway engineering consulting firm in St. Louis. Also on the team were Donald M. Tutko, then chief mechanical officer and now in the same position with Seaboard System, and J. W. Dent, then North Little Rock shop superintendent and now retired. Coles and Kolesa were the remaining planning team members. ■

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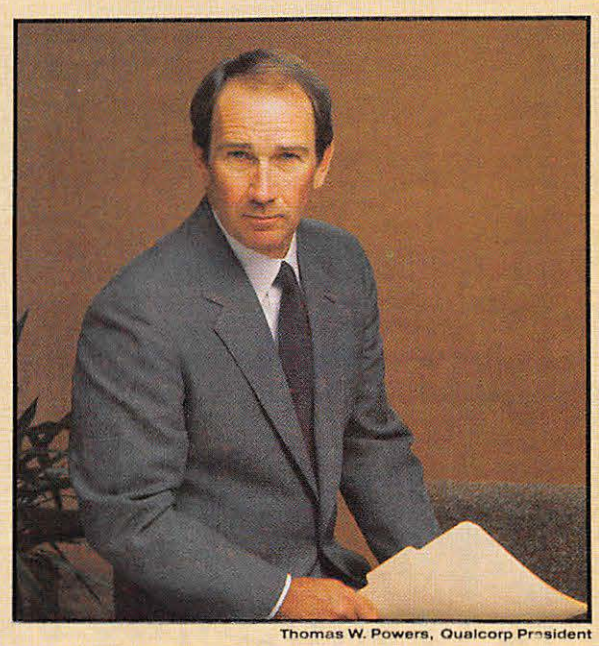

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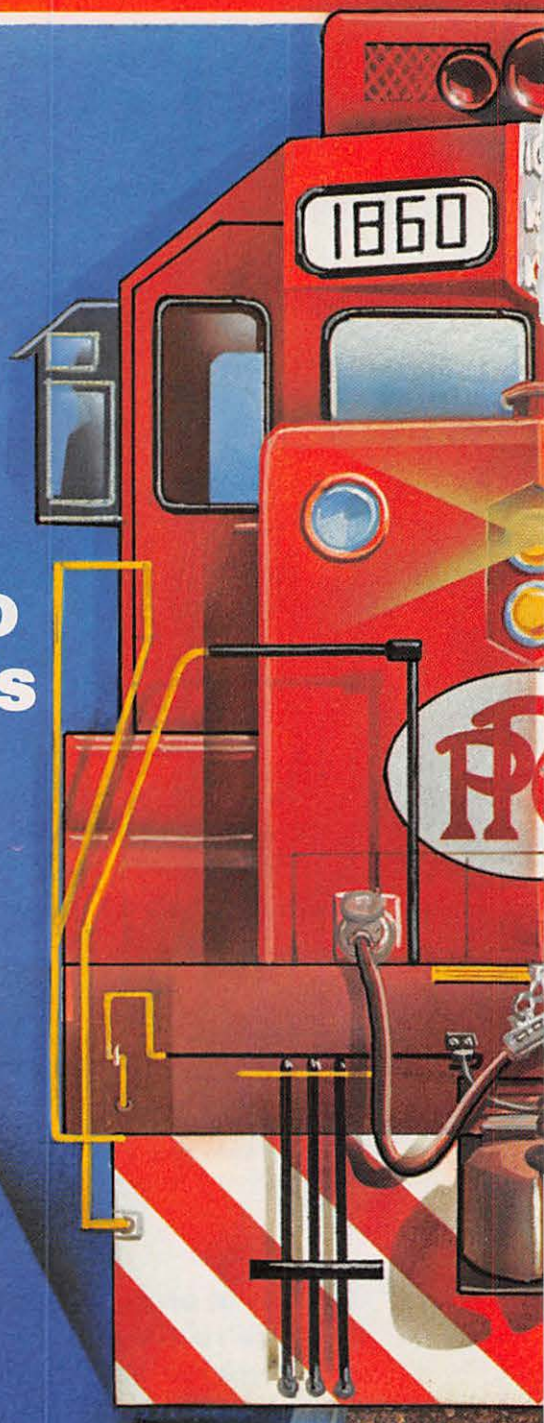

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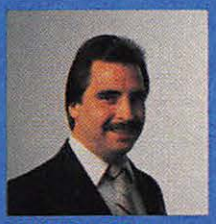
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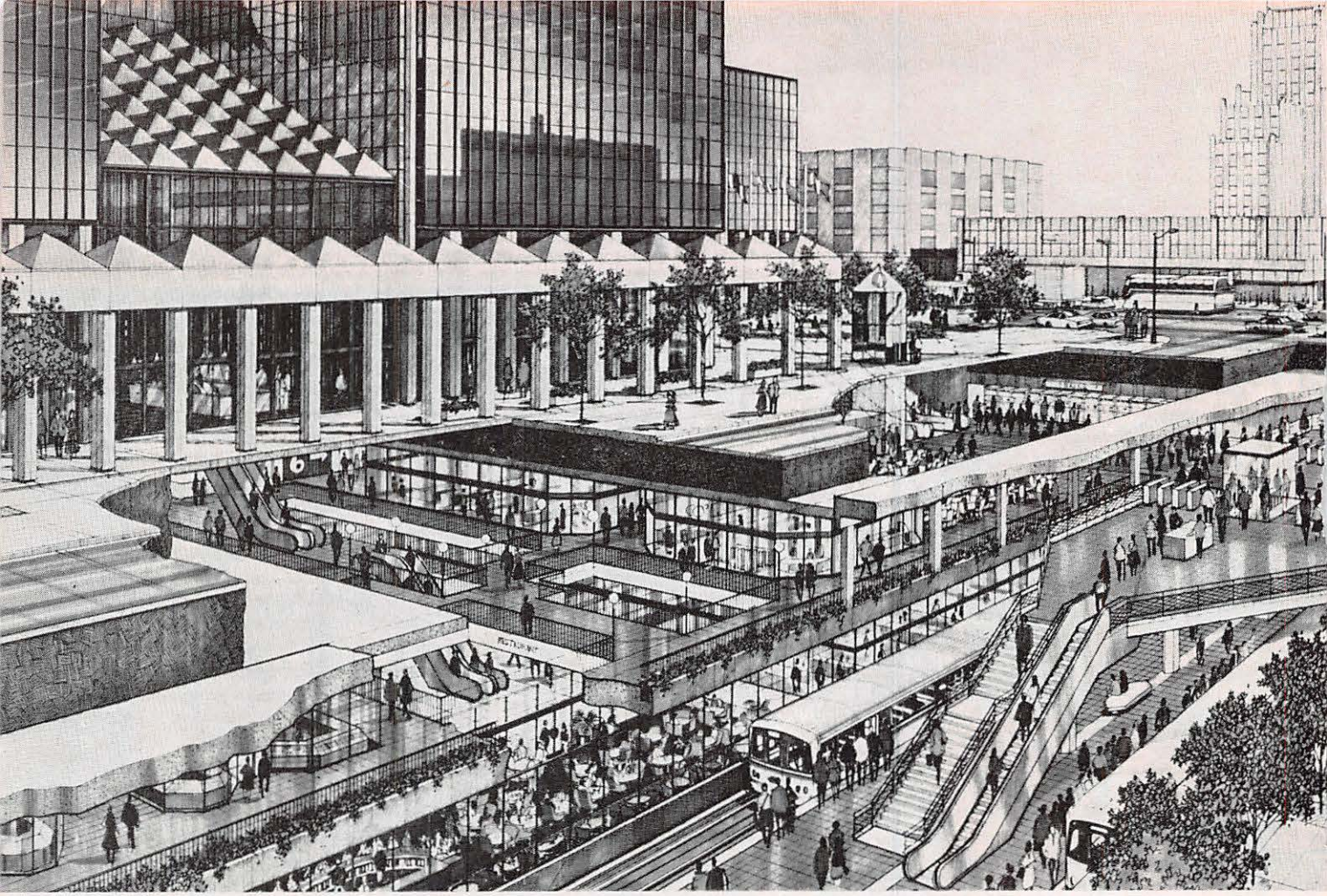


Los Angeles Metro gets a

The nation's second largest city was ready this summer to start digging a subway—but a federal funding snag sent planners back to the drawing board to scale down the first segment.

By WILLIAM D. MIDDLETON,
Contributing Editor

Getting started on rapid transit continues to be an extraordinarily difficult process for the Southern California Rapid Transit District (SCRTD) and the coalition of planners, politicians, business interests, and many others that has labored for so long at the task of building the financial and public support for a regional rail transit system for the second largest urban area in the U.S.

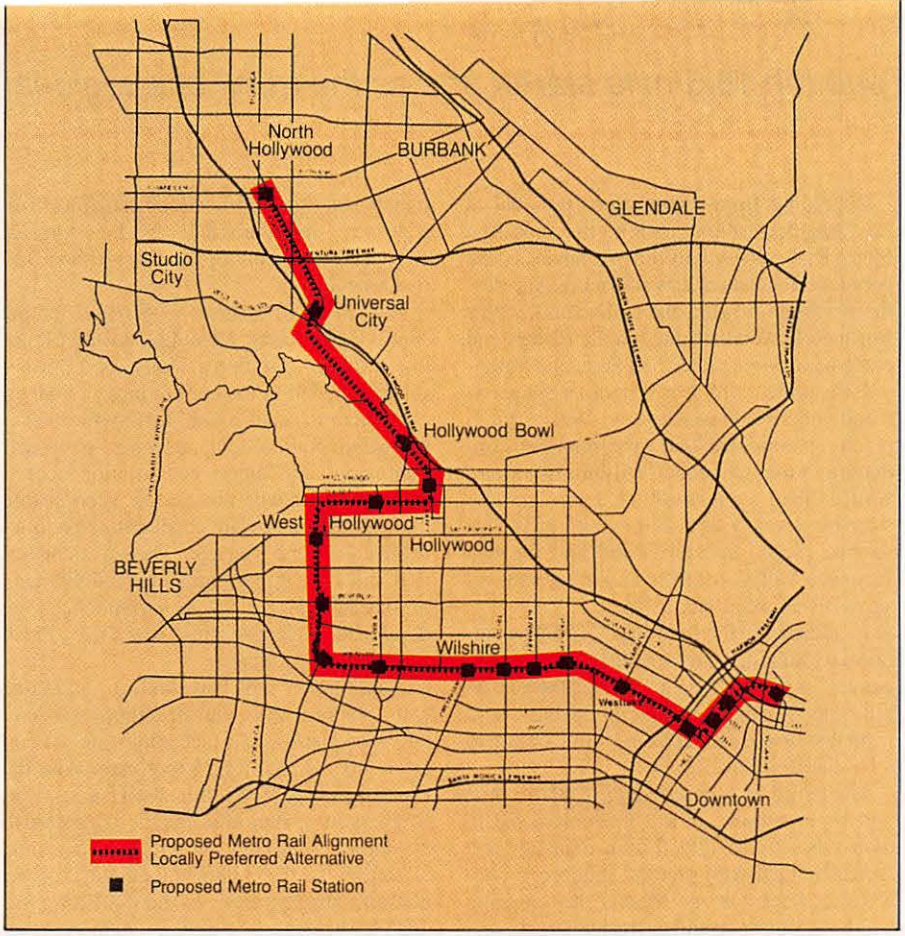
Over more than three decades of rapid transit planning there have been more than enough false starts, and three times in less than a decade—in 1968, 1975, and again in 1976—Los Angeles voters rejected financing measures that would have permitted a start to a regional system for Southern California.

A plan that finally seemed likely to work for Los Angeles began to take shape in the late 1970s, when planners pulled back in the wake of failed grand plans for a regional system and began to plan a more modest "starter line" project that could be financed from already available local funds together with an anticipated 80% federal share. Getting a consensus for just where that initial project should go was a difficult task, given the diverse needs and priorities of the area's fractured political jurisdictions that have always made Southern California regional planning so difficult. Agreement was finally reached late in 1979 when the SCRTD board approved an 18-mile Wilshire Corridor Subway that would extend westward from downtown Los Angeles along the densely-populated Wilshire Boulevard corridor, and then north through Hollywood to the San Fernando Valley.

Now known officially as Metro Rail, the project has finally emerged from the long planning process of route analysis, preliminary engineering, and environmental impact studies. After more than three decades of planning, Los Angeles is finally ready to start building.

Metro Rail is an impressive rail transit project that will serve one of Southern California's most densely-populated areas, and with the 1980 passage of Los Angeles County's Proposition A, which provides an assured base of local funding for transit development, Metro Rail is now seen as the central element of a regional rail system. Projected ridership for the line promises to make it one of the most heavily utilized subways in North America.

Currently the 64-square-mile Regional Core that will be served by Metro Rail accounts for nearly half of the all-bus Rapid Transit District's 1.6 million daily boardings, and within the Wilshire Corridor that parallels the inner end of the planned subway, SCRTD buses transport more than 190,000 passengers each weekday. And that, as RTD general manager John Dyer likes to point out, is equal to the daily ridership of the entire 71-mile BART



After 30 years of planning, SCRTD's rail-transit lines and stations still exist only on paper. The present route map calls for an 18.6-mile subway linking downtown Los Angeles, Wilshire, Hollywood, and North Hollywood. A total of 18 stations are planned (pictured is the artist conception for the Wilshire/La Brea Station).

slow order

system. By the year 2000, when Regional Core population is expected to reach one million, planners have estimated that Metro Rail ridership will have reached some 364,000 passengers each weekday.

Metro Rail, at a projected cost of $3.3 billion, is expensive, too, and therein lie some renewed uncertainties that threaten to curtail the ambitious project, or even to derail it entirely. Not too long ago SCRTD was planning a June 1984 ground breaking for the first Metro Rail construction. That didn't happen, and just when it will seems to become more uncertain with every passing day.

• **UMTA balks at cost.** Metro Rail's new funding difficulties were almost inevitable in the current austere climate for federal mass transit capital grants. That's more than a little ironic, for what has delayed Los Angeles for so long has been its inability to develop an assured local funding match for a federal share that had seemed for so long to be there for the asking. But now that Los Angeles has finally established a solid base of state and local funding, there just isn't enough money available in the current new-start authorization to permit the Urban Mass Transportation Administration to give Metro Rail a green light.

It isn't because they don't think Metro Rail is a good project, UMTA officials are quick to point out. In a recent evaluation of new-start proposals prepared for Congress, UMTA rated the Metro Rail project second only to a Seattle bus tunnel proposal as a cost-effective transit proposal.

"We've never questioned the merits of the project," says UMTA associate administrator for grants management Robert H. McManus. "We think it's a worthy project. The problem is that it's a high cost project relative to the available resources."

Given the limits in the currently available authorization for new starts, points out McManus, UMTA simply cannot issue a letter of intent, which amounts to a pledge to make available an authorization, for the full Metro Rail project or even for the 8.8-mile minimum operable segment of the project that has been identified in SCRTD's submittals.

"We've been trying to get Los Angeles to segment the project," says McManus. "They are finally beginning to do this."

Responding to these realities, SCRTD filed a revised application for Metro Rail funding support in June, proposing a new first phase project that comprises a four-mile, five-station section of the subway extending from Union Station to Wilshire/Alvarado that would cost close to $1.2 billion. Presumably, this is a project that UMTA could support, but just how much Section 3 money could be made available, and how soon, is far from clear.

So far, the District already has $105 million from the 1984 authorization that's earmarked for final design and real estate acquisition, while the Los Angeles share of the 1985 authorization that's now working its way through Congress will probably total around $117 to $119 million. There's some hope for an increase in the new-start authorization based upon higher revenue projections for the special gas tax for mass transportation, but that's far from certain.

Before UMTA can act on this proposal, SCRTD must first satisfy the environmental review process. General manager John Dyer has proposed that this be done through submittal of a revised environmental impact assessment. If a revised assessment results in a "no significant impact" finding, SCRTD will have foreshortened the environmental review process. But if it doesn't, they'll have to go through the much more protracted process of submittal and review of a supplemental environmental impact statement.

A more conservative approach would be to begin with the lengthier supplemental EIS procedure, but just which route UMTA will require SCRTD to take is not yet decided. However the environmental review process is satisfied, it will clearly be at least a few months before SCRTD can expect a decision on Metro Rail funding. Until then, no construction start seems likely.

• **Holding on to local support.** If the scaled-down first phase project offers SCRTD a way out of the federal funding dilemma, it also creates some new problems for Metro Rail. For without a firm federal commitment to completion of the entire project, Metro Rail is in danger of losing vital state and local support.

While California governor George Deukmejian has continued to support the project, one member of his administration, deputy director of business, transportation and housing Dana Reed, was quoted recently as believing that the state's $400 million commitment to the project might be scaled down if something less than the full project is built.

The prospect for loss of local support is a very real one, and SCRTD general manager Dyer is trying to avoid this by asking UMTA for a letter of no prejudice for the entire 18.6-mile subway in addition to the letter of intent that will permit work to start on the four-mile first phase. Even though such a letter falls far short of any form of federal pledge or commitment to the full project, it is seen as tangible evidence that the full project will eventually be built. And, as Atlanta has done, Dyer hopes that the letter can be used to persuade state and local officials to put up a greater share of early funding for the project with a

prospect for reimbursement from federal grants that may later be made available for the work. UMTA administrator Ralph L. Stanley, however, has said that he doubts that such a letter will be issued.

In still another effort to reassure local supporters, SCRTD has talked of plans to go ahead with some real estate acquisition over the entire route, and to commence construction of one of the San Fernando Valley stations, most likely at Universal City. A bill recently passed by the California legislature and awaiting the governor's signature, in fact, requires that the latter be done. Introduced by a San Fernando Valley legislator, state senator Alan Robbins, Senate Bill 1995 requires that at least 15% of state and local funds allocated to Metro Rail be used for constructing a San Fernando Valley station, with work to begin within a year of a start to construction elsewhere.

Even as efforts to resolve funding for a construction start went forward, SCRTD has been putting in place the team it will need to start building. Design consultants, already in place, include Daniel, Mann, Johnson & Mendenhall; Parsons, Brinckerhoff, Quade & Douglas, Inc.; Kaiser Engineers; Harry Weese & Associates; and others. Early in July SCRTD signed up as construction manager for the project a 15-member consortium headed by The Ralph M. Parson Company of Pasadena. Principal firms in the team, in addition to Parsons, include Parsons subsidiary De Leuw, Cather & Company and Dillingham Construction, Inc.

In another important move that should help to keep Metro Rail construction on schedule and within budget, SCRTD last month signed a "work stablilization" agreement with 40 Los Angeles building trades locals that will ban strikes, work stoppages, and lockouts, with provision for uninterrupted work through any collective bargaining strikes, with retroactive payment of any pay increases. The agreement also provides for a labor-management "oversight committee" that will monitor enforcement of prevailing wage laws on the project, and prohibits picketing of nonunion contractors.

Just about everything, then, is now ready for that all-important next step for Los Angeles rapid transit—a construction start. Given the agility with which they've survived so many previous setbacks, the odds just have to be good that the SCRTD and its supporters can successfully find a way through the current finding dilemma, too. Maybe they won't quite make it in 1984, but this time Los Angeles is closer than ever before to getting started. And once they do, there won't be any stopping them. At long last rapid transit for Los Angeles will be safely on its way.

• **Small start, big goal.** The Los Angeles Metro Rail Project is an 18.6-mile subway that its planners see as the central trunk of a regional rail transit system that will eventually total some 140 to 160 miles.

Beginning from a downtown terminal at Los Angeles Union Station, the proposed Metro Rail subway will link the business and population centers of downtown Los Angeles, the Wilshire Corridor, and Hollywood, with a North Hollywood terminal in the eastern end of the heavily-populated San Fernando Valley.

If the project's route map looks a big gerrymandered, it's because it is. While initial planning indicated that an alignment continuing to the west under Wilshire Boulevard would have generated an even greater ridership level, a turn to the north at Fairfax Avenue picked up Hollywood and the San Fernando Valley—and the important political support that went with them.

In addition to the full route, SCRTD's preliminary engineering studies and environmental impact statement have identified an 8.8-mile, 12-station minimum operable segment that would extend from Union Station to a Fairfax/Beverley station.

The entire 18.6-mile length of Metro Rail will be in subway. It will be constructed in twin tubes, each 17½ feet in diameter and typically lined with precast, reinforced concrete segmented liners. Most of the tunneling will be through soft soil or fractured rock, and engineers have estimated that about 85% of the tunneling can be accomplished with tunnel boring machines utilizing a circular shield. Hard rock tunneling through the Santa Monica Mountains will be accomplished either with a hard rock tunnel boring machine or by conventional drill and blast tunneling. Here, cast-in-place conrete tunnel lining will probably be used. The remainder of the subway, including all station, pocket and crossover tracks, and ventilating shaft locations, will be constructed by cut-and-cover methods.

• **The earthquake factor.** While Metro Rail tunneling is expected to be relatively easy, as tunneling goes, project engineers expect to encounter some unusual conditions that will require special precautions. Seismic design is a requirement, of course, and the route crosses a dozen known earthquake faults. Fortunately, all but two of them are inactive.

A much more difficult set of problems is presented by possible methane gas infiltration into the subway tunnels from oil and gas deposits in six oil fields on, or near, the tunnel alignment, among them the famous La Brea Tar Pits just off Wilshire Boulevard. The threat of gas explosions during construction is probably the greatest danger, and their prevention will require careful detection measures and venting. Where necessary, special steel tunnel lining will be installed to prevent gas infiltration into the completed tunnel.

The Metro Rail track system will employ 115 pound continuously welded rail supported by resilient rail fastenings, resiliently supported ties, or a floating slab track support system to minimize noise and vibration.

A storage yard, together with Metro Rail maintenance facilities, will be constructed on a 40-acre site adjacent to the Los Angeles River and just south of the line's Union Station terminus.

A total of 18 stations is planned for the Metro Rail subway, although construction of one of these—a station at Hollywood Bowl—is not included in the current project budget.

In order to establish an identity for the entire Metro Rail system, minimize passenger confusion, and attain construction economies, SCRTD will standardize such station design elements as fare collection areas, platform areas, and signage. Design architects will still have opportunities for individuality in station design through variations in site development, landscaping, entrances, finish materials, and colors.

Each station will have both a mezzanine and a platform level, and all stations will have 450-foot platforms to accommodate a maximum six-car train of 75-foot cars. With the exception of the Wilshire/Fairfax station, where special siting considerations have led to a station design with stacked side platforms, all stations on the system will employ a center platform arrangement. At the downtown 7th and Flower station the design will incorporate a continuous mezzanine and knock-out panels on the Flower Street axis to permit future connection between the Metro Rail station and a light rail station in Flower Street that is contemplated in one of three downtown alignment alternatives being considered for the Los Angeles County Transportation Commission's Los Angeles-Long Beach light rail project.

A single main shop building at the storage yard site south of Union Station will provide space for routine servicing, inspection, and heavy repair of cars, as well as facilities for component servicing, testing, and repair.

• **Power supply.** Metro Rail will operate from a conventional 750 volt d.c. third rail traction power system, centrally controlled from the project's Control Center at Union Station. Power will be supplied from two utility companies—the Los Angeles Department of Water & Power and Southern California Edison—through 34,500 volt or 16,000 volt a.c. primary distribution circuits feeding a total of 18 traction power and 5 auxiliary power substations.

An Automatic Train Control (ATC) system will permit a two-minute minimum headway. Metro Rail's ATC will have three main functions:

—Automatic train protection, to monitor safe train separation, establish and enforce maximum safe speeds, provide protection against opening doors unless a train is fully stopped, and prevent train movement if doors are open.

—Automatic train operation, to control the manual or automatic operation of trains, regulate train speeds, and control the programmed entry and stopping of trains at stations. Door operation, station dwell times, and train de-

partures will be manually controlled by train operators.

—Automatic train supervision, to maintain intended train headways and schedules, and to control train stops and routing.

• **Off-the-shelf cars?** Metro Rail plans to use an air conditioned, stainless steel car. Each car will be 75 feet long, 10½ feet wide, and 12 feet high, with loading standards of 90 passengers for off-peak periods and 162 passengers for peak periods. Cars will operate in married pairs, with train operation of a maximum of six cars. Each car will be powered by four traction motors capable of achieving a 3 mph per second acceleration rate with a fully loaded train and a maximum speed of 70 mph. A series direct current chopper control system will permit the use of either regenerative or resistive electrical braking.

SCRTD wants to come as close as it can to buying an "off the shelf" car design, and specifications for the Metro Rail fleet will establish performance standards that can be met, or very nearly met, by several current designs, among them the Budd Baltimore/Miami car, MARTA's Hitachi car, New York's R-68, the WMATA Breda car, or TTC's Hawker-Siddeley H-5. A fleet of some 140 cars will be required to meet the projected year 2000 Metro Rail traffic level.

In 1990, when the full 18.6-mile line is projected to be in operation, Metro Rail planners expect the subway to transport a weekday traffic of 268,000 daily passengers. To provide that capacity trains will operate on a 6-minute peak period headway, with a midday headway of 7½ minutes, and evening, weekend, and holiday headways of 15 minutes.

By the year 2000, when traffic is projected to reach a level of 364,000 passengers each weekday, six-car trains operating on 3½-minute headways will be required to meet peak period demand. Ultimately, with peak period trains operating at Metro Rail's designed 2-minute minimum headway, SCRTD expects the subway to be capable of handling a traffic some 50% greater than the projected year 2000 level.

SCRTD plans a Metro Rail fare collection system of fare gates, ticket vending equipment, change machines, and add-fare machines located on station mezzanines that will permit a fare structure based upon distance traveled utilizing encoded tickets. The planned system will also permit the use of various types of multi-trip tickets, valid on both Metro Rail and RTD buses, and monthly passes.

In its preliminary engineering development SCRTD has developed a construction schedule that could have the entire project ready for revenue service by the end of 1990, with the first construction activity to begin in 1984. Construction would be carried out in four overlapping project phases between Union Station and North Hollywood, with the first two phases comprising the minimum operable segment between Union Station and Fairfax/Beverly that could be ready for revenue service in February 1990. The initial construction activity scheduled for 1984 would include Metro Rail yard and shop facilities south of Union Station, with the first tunnel and station construction to begin in the first part of 1985. That schedule, of course, will soon begin to slip without an early resolution of final design and construction funding support for the project. SCRTD plans to develop a new project schedule once a better idea of total funding and projected cash flow for the work is available.

With funding for the initial 18.6-mile Metro Rail subway still far from assured, construction of any extensions is clearly only a very long range prospect. Nevertheless, SCRTD has identified at least two possible extensions and will make provision in station and tunnel design for the initial project that will permit both of them. One would extend Metro Rail further west through the Wilshire Corridor to Santa Monica, while the other would extend south and east from Union Station to Norfolk or Santa Ana. ■

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People in the News

AMERICAN HIGH SPEED RAIL CORP.—Herbert M. Priluck named vice president in charge of engineering and construction of the planned 130-mile high speed line between Los Angeles and San Diego.

BANGOR & AROOSTOOK.—Linwood W. Littlefield named senior vice president. He had been vice president-operations since 1973.

BURLINGTON NORTHERN.—The Marketing Communications unit of the railroad has moved from St. Paul, Minn., to Fort Worth, Tex.

CHESSIE SYSTEM.—Robert T. Patterson named assistant general manager-transportation; **John J. Paylor** named director-marketing services; and **C. Norman Murphy** named director-sales & development for the Real Estate & Industrial Development Dept.

Theodore R. Jackson named general manager-real estate and industrial development. **Maurice E. Good** named assistant vice president-lines operation, Cleveland.

Alan A. Rudnick named assistant vice president-treasury and taxation, and **Albert B. Aftoora** named treasurer.

Mary Jane Skala, formerly assistant editor of **Chessie News,** named editor. **Kathleen E. Swan** named assistant editor.

CONRAIL.—Richard E. De Gennaro named director-intermodal marketing, replacing **Peter A. Rutski,** named director-intermodal sales.

DENVER & RIO GRANDE WESTERN.—M.M. Kanderis named director of personnel and labor relations, succeeding **J.W. Lovett,** retired.

GRAND TRUNK WESTERN.—Gerald L. Maas named executive vice president, responsible for all GTW operations, marketing, finance, personnel, and labor relations.

Howard D. Nicholas named controller.

NATIONAL MEDIATION BOARD.—Helen M. Witt designated chairman, succeeding **Walter C. Wallace,** who remains with the board. Ms. Witt, who was appointed to the board in November 1983, is the first women to head the agency since its inception 50 years ago.

Robert O. Harris resigned his position on the board July 31 to become Ombudsman of the **International Monetary Fund.**

Gerald L. Maas
Grand Trunk

C. Rodney Black
Union Pacific

Kendall L. Anderson
ASF

Norman A. Berg
ASF

SANTA FE SOUTHERN PACIFIC CORP.—Richard K. Knowlton named senior vice president-law of **SFSP** and its subsidiary, **Santa Fe Industries. Jerome F. Donohoe** appointed vice president-law for both companies.

SEABOARD SYSTEM.—Wandaleen Poynter named director of marketing-contracts and commerce; **James C. Oaks** named assistant vice president-coal traffic development; and **John W. Futch, Jr.** appointed regional sales manager, San Francisco, succeeding **George M. Reynolds,** who retired June 30 after more than 35 years' service.

UNION PACIFIC SYSTEM.—In the Marketing and Sales Department, Omaha, **C. Rodney Black** named general director of industrial development and **Robert R. Parker** becomes director of industrial development. **Edward M. Ewbank,** director-industrial development planning and analysis, assumes additional duties as director-industrial tracks.

Nobuaki Terasaki appointed manager-international sales, Los Angeles.

George J. Heidenreich named senior manager contracts, commerce and special projects and **R. Bruce Talbott** appointed manager rate quotations and tariff services, **Union Pacific System,** Omaha.

For **Missouri Pacific Railroad, Thomas R. Green** named director of labor relations-system, St. Louis; **Ronald P. Mitchell,** director of labor relations-Western District, Kansas City, Mo.; **Claude C. Courtway, Jr.,** director of labor relations-Eastern District, North Little Rock, Ark.; **Thomas L. Wilson,** director of labor relations-Southern District, Spring, Tex.; **James H. Walker,** director of labor relations-Texas District and **Alton & Southern Railway,** with offices in both Dallas and St. Louis. Named directors of labor relations with headquarters in St. Louis: **William G. Armstrong,** shop crafts; **Wayne E. Naro,** maintenance of way and signals, and **Vincel E. Hanika,** non-ops.

Suppliers

Amsted Industries Inc. named **Norman A. Berg** president of **American Steel Foundries,** succeeding **Louis D. Davis,** retired. **Kendall L. Anderson** appointed vice president-marketing for ASF, succeeding Mr. Berg.

Atlantic Track & Turnout Co. named **John L. Schafer** vice president and regional manager, Shaumburg, Ill. Also at Shaumburg, two new salespersons have been appointed: **Robert Saley** and **Elaine Beard.**

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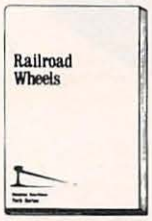

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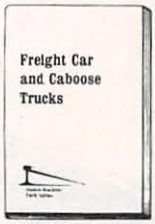

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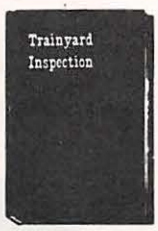

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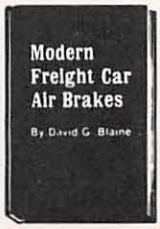

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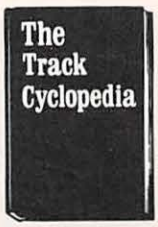

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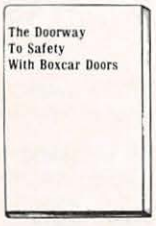

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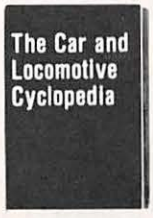

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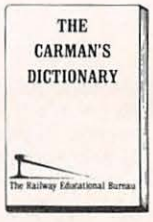

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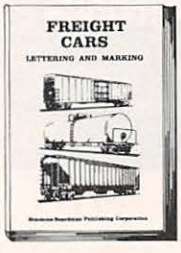

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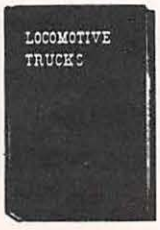

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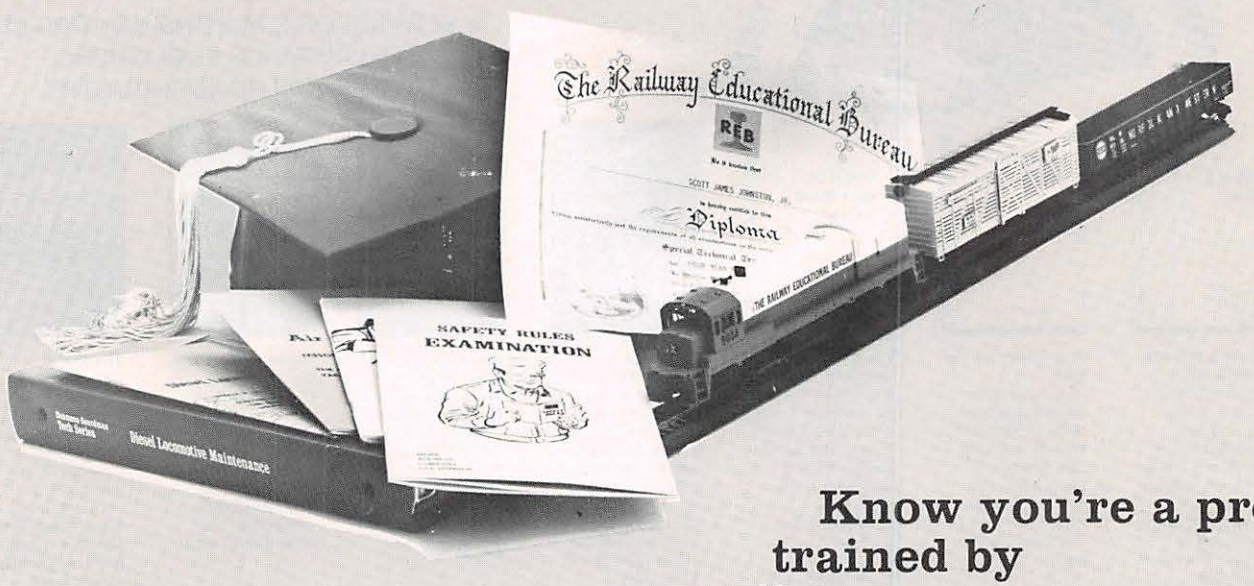

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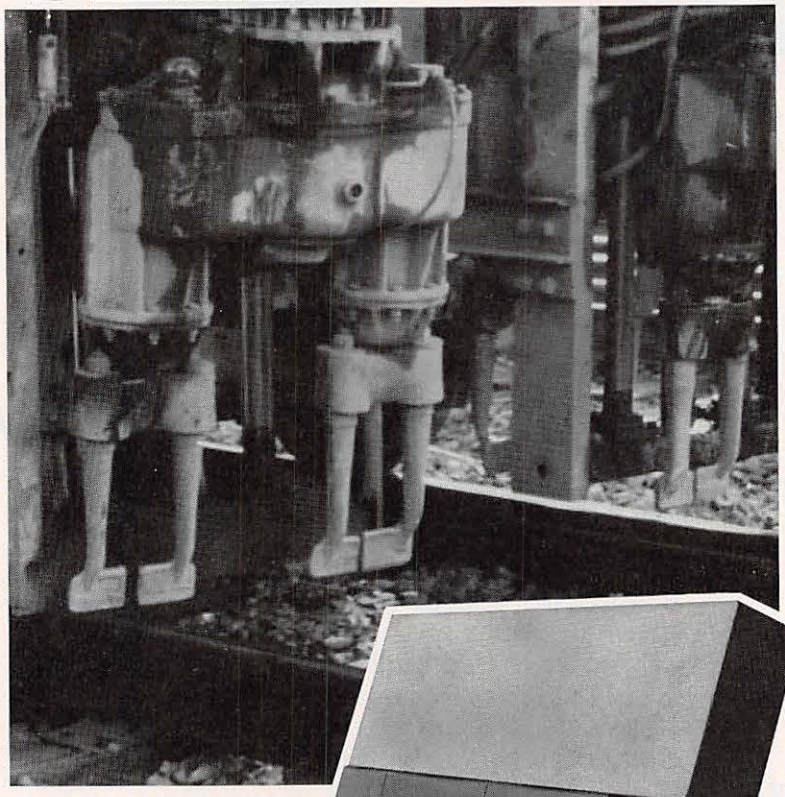

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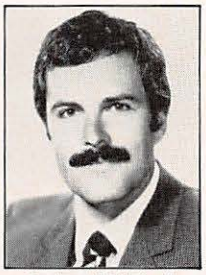

Robert W. Thull
BRAE Intermodal

McConway & Torley Corp. appointed **Joseph Kahl** vice president-sales and marketing. Mr. Kahl has worked in various sales and management positions in the railway supply industry for the past 16 years.

BRAE Corp. appointed **Robert W. Thull** vice president-marketing for **BRAE Intermodal Corp.**

PLM Railcar Maintenance Co. named **Martin B. Richards** corporate controller, succeeding **Steven M. Bess,** who was promoted to vice president, operations, of **PLM Investment Management, Inc.**

The Okonite Co. named **George F. Gaffney** sales representative, St. Louis District.

Safety Electrical Equipment Corp., manufacturer of heating and air conditioning equipment for rail transit, has changed its name to **Stone Safety Corp.** to reflect the total consolidation of its parent company, **Stone International.**

Hyatt Clark Industries, Inc., a New Jersey-based bearing manufacturer, appointed **Robert Erdmann** sales manager, railroad products, and **D.W. Gill** manufacturer's representative in Canada.

Harris Corp.'s Farinon Div. named **Carl C. Creamer** vice president of field operations and customer service, and **Kern M. Hughes** vice president of manufacturing. Mr. Creamer was formerly with **AEL Microtel,** and Mr. Hughes was with **Alta Technology, Inc.,** and before that, the **Collins Transmissions Div. of Rockwell International.**

Chester Cablewave Systems Corp. appointed **Douglas Proctor** president of technology and **George Gigas** executive vice president of operations. The company makes and services microwave parabolic an-

People in the News

tennas, coaxial cables, and associated products.

Parsons Brinckerhoff appointed **William H. Lathrop** Far West regional manager, with headquarters in San Francisco. Mr. Lathrop is currently project manager for design of the **Bay Area Rapid Transit** turnback and yard in Daly City and the design of the **Guadalupe Corridor** transit project in Santa Clara County.

Tau-tron, Inc. a unit of **General Signal,** named **Jonathan D. Stone** marketing research analyst, and **John D. Chipman** product manager for fiber optic instruments.

Bally Case & Cooler, Inc. an **Allegheny International** company, has changed its name to **Bally Engineered Structures, Inc.,** to reflect its production of non-refrigerated buildings as well as refrigerated structures.

Modagraphics, manufacturer and applicator of fleet graphics and corporate signage, named **Joseph Wleklinski** vice president of sales and **Peter Bambach** vice president of intermodal sales. Both will be based in Rolling Meadows, Ill.

Railmode is the name of a new consulting firm in Chicago providing short-line feasibility analysis and general management services for railroads and private-car owners. Officers include **John Gohmann,** president; **Tomas Minard** and **W.W. Collins,** vice presidents; and **Donald Bennett,** "of counsel."

The Ohio Brass Co. named **Rob Tannor** western regional manager-transit, succeeding **Elmo F. Huston,** who retired July 31 after 38 years of service.

Paceco, Inc., manufacturer of container handling cranes and a subsidiary of the **Fruehauf Corp.,** appointed **George J. Thompson** vice president-technical director. Mr. Thompson had been vice president-engineering for **General American Transportation Corp.**

Industrial Traffic

Bethlehem Steel Corp. appointed **Herman E. Letke** manager of transportation operations in the transportation group, succeeding **Carl W. Eckenrode,** named vice president, administration for the company's six subsidiary railroads.

X-Rail Systems, Inc., a nationwide terminal and distribution company, appointed **Harry C. Buffum** vice president. Mr. Buffum was formerly sales manager at **Conrail.**

Obituary

Robert B. Curry, who retired in 1975 as vice president of the **Association of American Railroads' Management Systems Dept.,** died June 23.

John Rubel, 36, president of **North American Car Co.,** died July 6 in a highway accident at Palatine, Ill.

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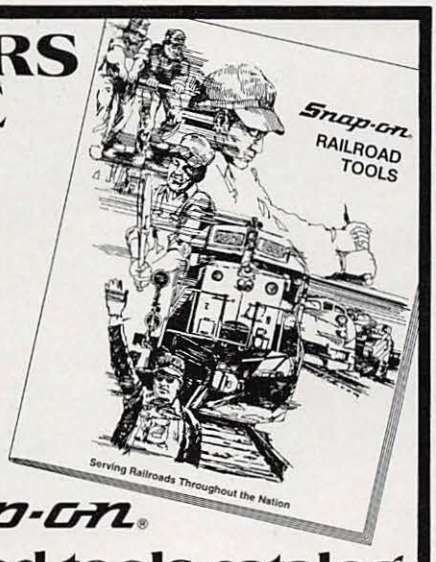

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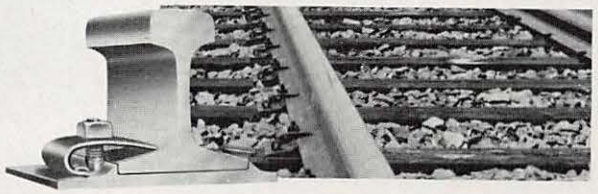

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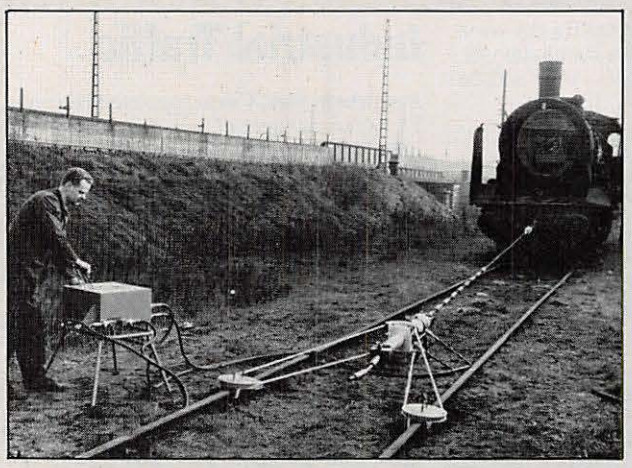
Products Report

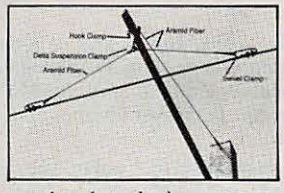


Hydraulic haulage/rescue device

The Hoesch precision hydraulic haulage and rescue device, available through Railquip, Inc., has a pulling capacity of 27 tons for precise movement of cars or other heavy objects. The complete system includes a hauling device, a pulling cable with bushings, a swivel, a 33-foot fastening cable, an endless retaining cable, and two rail brackets with clamping shoes. It is controlled using the same Hoesch control desk used with the company's lightweight hydraulic rerailing equipment. Portable hydraulic pump units with mounted control block are also available. (Photo shows a demonstration of the unit pulling an old steam locomotive.)

Write in 970 on Reader Service Card

Light rail catenary suspension

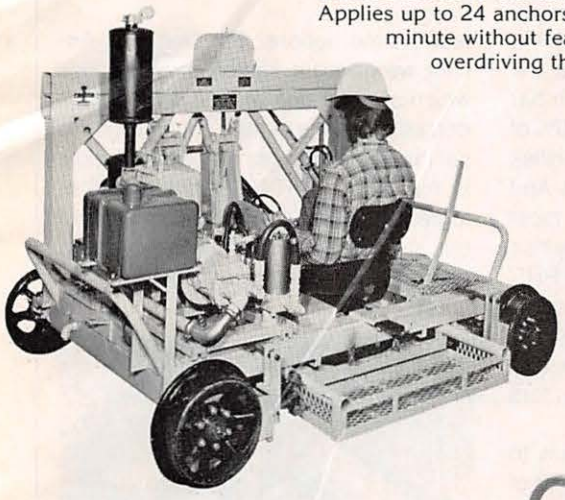


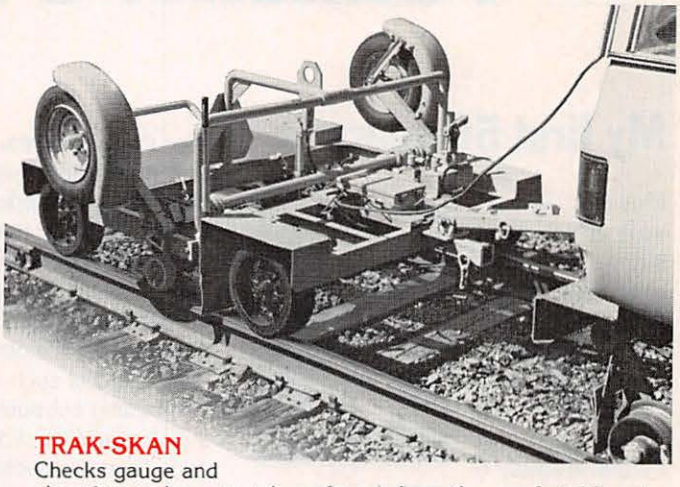
A new catenary suspension system for light rail is available from Mobile Transit Products. Aramid fiber down spans and special swivel clamp components are said to make the system lighter weight, simpler, easier to install, more aesthetically-pleasing, and less expensive than conventional steel wire systems. The Delta Suspension System is also designed to eliminate "hard spots," to reduce wear on the pantograph, says the manufacturer. It is being installed on new light rail projects in Manila, the Philippines; Alexandria, Egypt; and Nantes, France.

Write in 971 on Reader Service Card

rmance and dependability.

ANCHOR-FAST
Single nipper head easily handles boxing and applying anchors on 90 to 155 lb. rail. Applies up to 24 anchors per minute without fear of overdriving them.

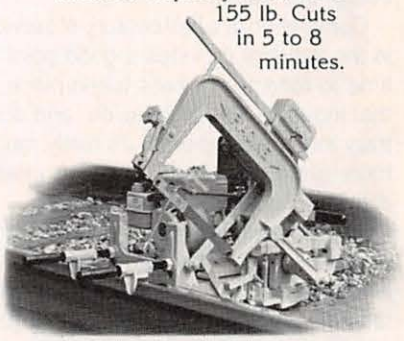




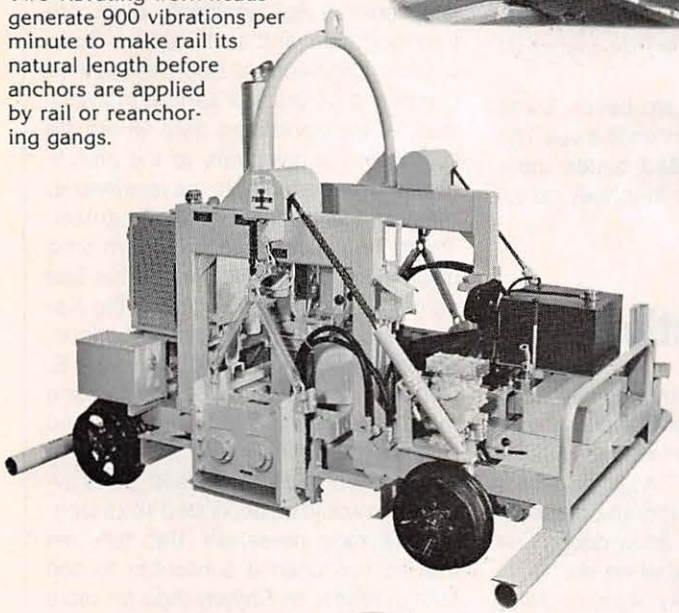
TRAK-SKAN
Checks gauge and elevation on long stretches of track from the comfortable cab of a tow vehicle. Dual sensing unit on trailer chassis is connected to electronic read-out device inside cab. Travels up to 17 mph, recording deviations as minute as ± 1½ inches on chart recorder and digital display.

DUAL-CLIP-APPLICATOR
Self-centering work heads install clips on both rails on concrete ties insuring positive alignment even on slightly skewed ties. Automatic sensing prevents overdriving of clips.

RECIPROCATING RAIL SAWS
Powered hack saw models 140 and 155 reduce rail failure due to fractures caused by torch cutting or nick and break method. Capacity from 60 to 155 lb. Cuts in 5 to 8 minutes.



DUAL-TRAK-VIBE
Two vibrating work heads generate 900 vibrations per minute to make rail its natural length before anchors are applied by rail or reanchoring gangs.



TIE-SAVR
Revolutionary free-flowing granular compound eliminates scrapping of spike-killed ties. Restores 80% of spike-to-tie bond. Easy to apply with hand or machine applicator. Adds several years to life-span of average spike-killed tie.

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Publisher's Perspective

My first 50 years

ROBERT G. LEWIS

President Roosevelt had just signed the Railroad Retirement Act when I reported for duty at the Pennsylvania Railroad's general offices in Philadelphia August 6 fifty years ago. One of my first tasks was to pick up the solid gold fifty-year service buttons at a jewelers on Chestnut Street and bring them back to the office where we arranged for the official presentations to those veteran employees reaching this service milestone. Had I stuck around—and had the PRR survived—and had I not "defected" for a year to work on the Bessemer & Lake Erie—I would be getting my own gold button this month.

Completion of a half century of service in the industry provides a good point in time to reflect on what's taken place in that industry. Nostalgia aside, and contrary to general opinion, it's really much more good than bad. It was an utterly different industry 50 years ago.

The railroad, when I first went to work, didn't own track maintenance machinery much bigger than a hand-held power tamper. We watched with interest, and skepticism, the bold experiment with continous welded rail on the main line of the D&H, then in service just one year and reporting five failed welds out of the 300 in that pioneer installation.

The diesel was around and generally viewed as a pretty good engine for yard service, but there were grave misgivings with respect to its ability to replace the steam locomotive in road service. The U.S. railroads had 50,000 steam locomotives in service—and fewer than 200 diesels! Wooden cars with steel underframes accounted for a full third of the two million freight cars in the national fleet, and some railroads were still ordering them. All had plain bearings. The American Railway Association (which later that same year became the AAR) was urging the railroads to meet the deadline for an order banning arch bar trucks from interchange service (30% of all cars in service still had this Achilles heel of the freight car running gear). And at that time—when the railroads most needed a hot box detector—nobody had ever heard of such a device. The PRR was putting out publicity releases on its then innovative slide detector fences, and, if my recollection is accurate, had placed dragging equipment detectors on the New York-Washington line.

The completion of electrification to Washington was in sight, and the first of 57 GG-1 electric locomotives was under test. The last of those fabulous locomotives was retired a year ago.

Government ownership was a day-to-day threat. The railroads were in debt in excess of $500 million to the Reconstruction Finance Corp. and the Public Works Administration. Some could not have survived without these low interest loans.

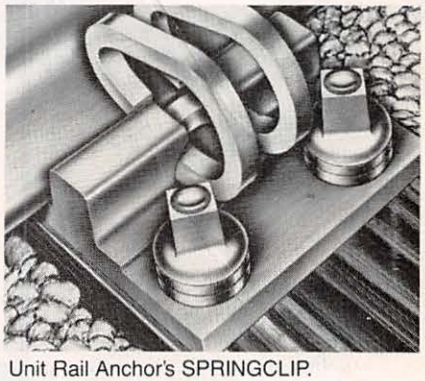
The Pennsy put out a release stating that every time they moved President Roosevelt from Hyde Park to Washington it cost $1,000! Three dollars a mile, they emphasized. Which makes one wonder what the per mile cost might be for Air Force One.

Today some things are better. Some things are worse. But listen to a vet: The railroads never provided better, more efficient transportation than they do today.

A fix on fixation

Wouldn't you think a guy who has been around the railroads for 50 years would know the difference between a rail fastener and a rail anchor? As it happens, I do. But sometimes, under the pressure of deadlines, what we *know* doesn't always square up with what we *do.*

In the June *Railway Age,* in John Armstrong's comprehensive story on ties and fastenings, "Guardians of the gauge," we illustrated a number of direct-fixation options. For Unit Rail Anchor we pulled a photo out of the files which showed one of their drive-on rail anchors, *not* one of their spring clips. To set the record straight, the device below *is* the UNIT SPRINGCLIP—the photograph that would have accompanied our story in June had we been sharp enough to catch the item before it went to press.


Unit Rail Anchor's SPRINGCLIP.

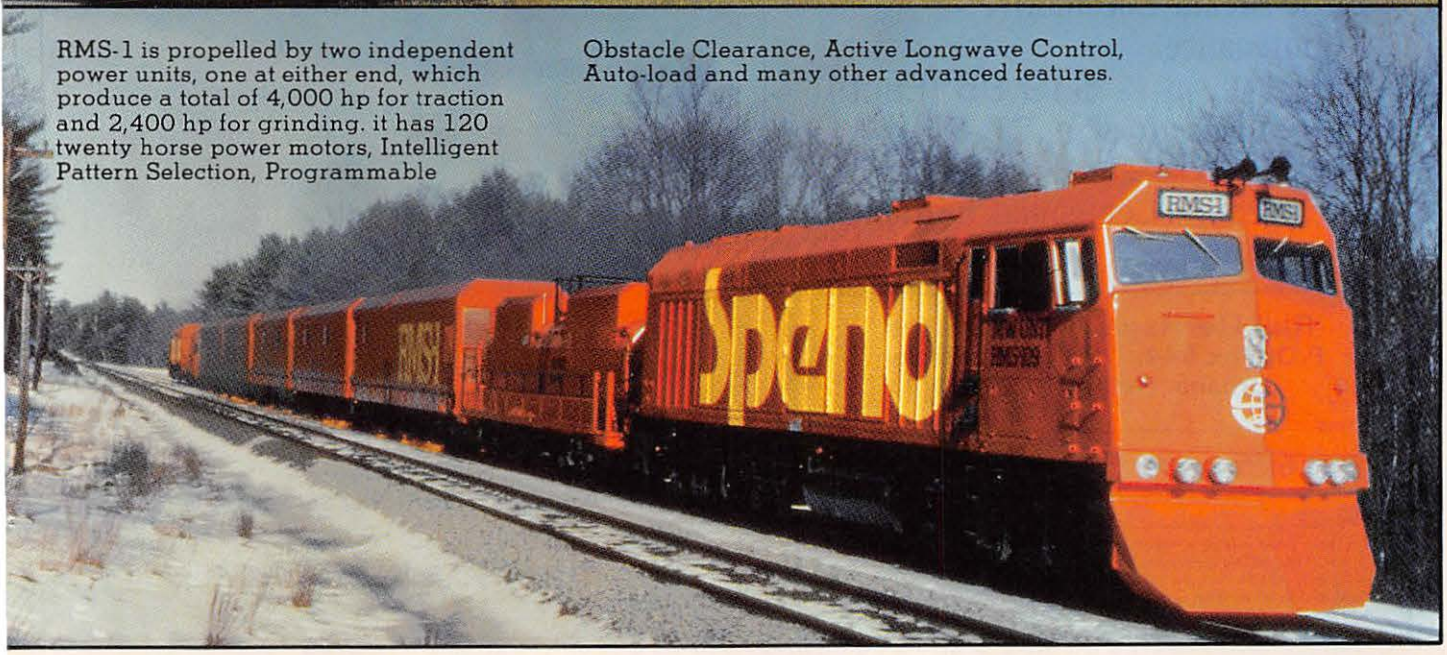
A winner retires

A man who has given much to the transportation field, J. Robert Morton, retired last month as vice president—corporate transportation and distribution, Combustion Engineering. Bob Morton had completed 47 years of service in the industrial transportation field where he contributed substantially to the profession and, importantly, to the relationship between the shippers and the carriers. Try to find a railroad president who doesn't know Bob Morton by his first name! Bob, a past president of the National Industrial Transportation League, was a recipient, in 1980, of the Harry E. Salzberg Memorial Medallion, among many other honors that he has collected over the years. If they gave away cups for achievement in the traffic field, Bob's living room would be decorated like a long-time Olympic medalist's. Bob tells me that he has been a subscriber to and faithful reader of *Railway Age* for more than 35 years, and is kind enough to say that it helped him many times in many ways during his long career.

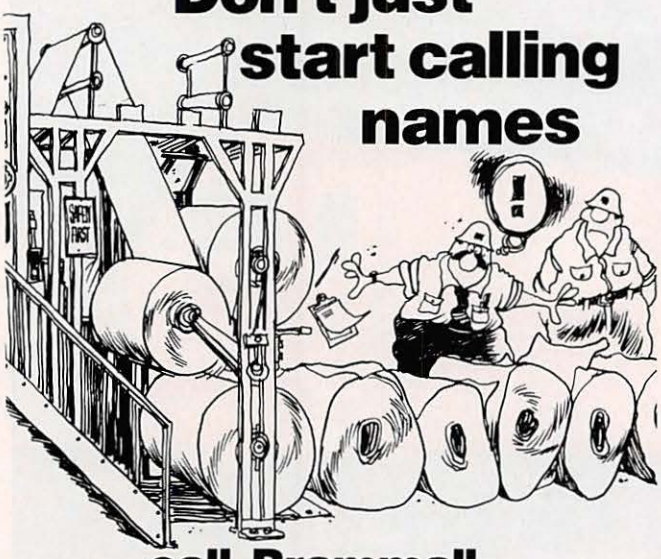
Speno Rail Surface Analyzer is a sophisticated, self-propelled test vehicle, designed to provide high-speed analysis of rail head surface condition. The RSA has a range of 1,200 miles. It will record at up to 40 mph and travels at 60 mph. The resulting data is recorded on magnetic tape for storage as well as being printed in hard copy for immediate use.

RMS-2 is the latest in our series of Intelligent Rail Maintenance Systems. It has 96 twenty horse power motors, Intelligent Pattern Selection, Programmable Obstacle Clearance, Active Longwave Control, Auto-load and many other advanced features.

RMS-1 is propelled by two independent power units, one at either end, which produce a total of 4,000 hp for traction and 2,400 hp for grinding. it has 120 twenty horse power motors, Intelligent Pattern Selection, Programmable Obstacle Clearance, Active Longwave Control, Auto-load and many other advanced features.



Don't just start calling names



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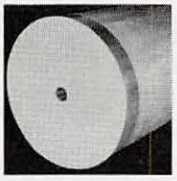

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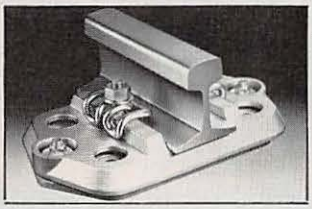
Products Report

Sound/vibration-reducing rail fixation



Elastic Spike Corp. of America has developed the CentriCon rail fastening system, a sound/vibration attenuating system that can be furnished with the Skl-3 rail clip (as pictured), Pandrol's "e" clip, Portec's Sidewinder, or other customer-specified rail clips. The new fastening system, first of the "SUPER FASTENERS" series of rail fixation products for North America, is available in a wide load range, from light/heavy rail transit to high-speed passenger or heavy-haul freight railroad operations. It can be installed on wood or concrete ties, concrete slabs or steel structures. Its inner components are described as a series of adjustable, tapered, rubber/steel "cups," or "doughnuts," that can be adjusted for different load/frequency attenuation requirements and can be exchanged in the field without removing the fastening system.

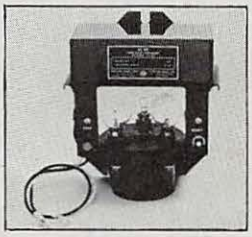
Write in 975 on Reader Service Card

Thermoplastic wear plates

Dayco's Duraguard wear plates, made of an ultra-high-molecular-weight polymer that is molded around a soft steel mesh reinforcement, are said to deliver four times the abrasion resistance of stainless steel and to virtually eliminate wear on expensive steel mating parts. The wear plates are designed to retain their toughness in extreme temperatures, ranging from −65 to 275 degrees Fahrenheit. Additional advantages include virtual elimination of coupler shank wear, elimination of lubrication, resistance of fatigue and flex stresses, easy installation, high chemical resistance, and low noise. The wear plates can be custom made to fit coupler carriers of any size or shape, standard or long shank.

Write in 976 on Reader Service Card

Failsafe signal lights



The LC-3P Lampchanger from the Tideland Signal Corp. automatically rotates a new bulb into place when one burns out. Designed for the rugged environment of trackside railroad signals, the unit incorporates two special types of plastic developed by General Electric Co.'s Plastics Group. The rotating base is made of Valox® resin, chosen for its high heat deflection temperature and low water absorption qualities, both of which help to maintain electrical contacts in adverse weather. Housing of the internal electrical system is made of Lexan® resin, chosen for its impact strength and stability in extreme temperatures.

For information on the Lampchanger,
Write in 977 on Reader Service Card

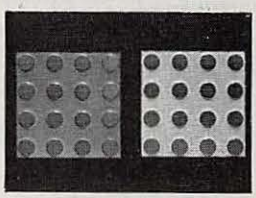
For information on Valox and Lexan resins,
Write in 978 on Reader Service Card

Microprocessor-based ticketing

AEG-Telefunken has developed a new ticket-issuing system that features a memory module which keeps track of all tickets sold during a salesperson's shift. The salesperson inserts the memory module, which is the size of a cigarette pack, into the ticket machine at the start of the shift and turns it in to the accounts center at the end. Thus, sales data can be evaluated quickly and accurately. Two ticket machines are available: one for stationary operation, and a compact unit for mobile operation. The system was designed to allow full integration with any public transit company's existing data processing system.

Write in 979 on Reader Service Card

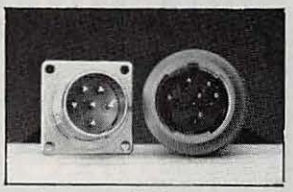
Transit platform safety tiles



American Olean Tile Co. has developed a new floor tile for use in warning strips to keep passengers a safe distance from the edges of subway platforms, ramps, and stair landings. The brightly-colored glazed tile features unglazed raised surface disks that are said to be easy to detect even by visually impaired persons. Size is six inches by six inches.

Write in 980 on Reader Service Card

Fiber-optic connectors and accessories



The Breech-Lok family of fiber-optic connectors, accessories and assembly tools is available from G&H Technology, Inc. The connectors are claimed to achieve performance of less than 1.2 dB, and they are designed for field assembly in less than five minutes. Assembly requires no polishing, epoxies or index matching fluids; terminations are provided by the company's Breech-Lok fiber-cleaving and contact-crimping tools.

Write in 981 on Reader Service Card

Formatted carloadings data

The Association of American Railroads' RAILINC subsidiary is offering hard-copy reports of AAR CS54A carloadings data in formats specified by subscriber. Subscribers request reports on various combinations of railroads, commodities and time periods, and receive the formatted data on a weekly, monthly or quarterly basis. For example, the user could ask for all Class I weekly carloadings, ton and ton-mile data for the current week this year vs. the corresponding week last year; the current four weeks this year vs. the corresponding four weeks last year; and the year-to-date this year vs. last year, with percentage changes.

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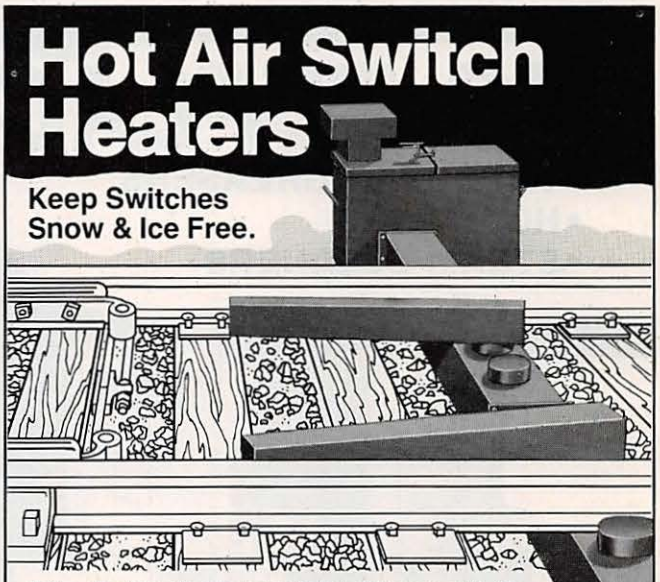

Railway Equipment's new design for hot air blowers melts the snow and ice from the entire switch area keeping switch points and rods free. The high efficiency blower gives you increased air flow and improved evaporation to prevent icing.

Models available to meet your needs: gas fired with 100,000 to 500,000 BTU/hr output or electric with 15 KW to 50 KW output, local/remote operation and reply indication, three types of standard ductwork for switch points and stock rails. With easy installation and maintenance, the units offer years of dependable performance. For more information:

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Products Report

Harmon module case

A sturdy carrying casy available from SAB Harmon Industries, Inc., is designed to store and transport spare modules for Harmon PMD, HXP-1, and AFTAC equipment. It is constructed of ¼-inch plywood covered in tough, nonslick plastic, with metal-reinforced corners. The field modules are protected internally by foam padding and moveable interior partitions can be configured to meet specific needs. The latch cover can be padlocked for security.

Write in 983 on Reader Service Card

Lining system for coal cars

A new protective coating system to line coal cars and eliminate the problem of coal freezing to the sides of the cars has been developed by Plasite. The lining consists of PLASITE 725 Primer and PLASITE 7135.

Write in 984 on Reader Service Card

Storage and shipping covers

A new copolymer laminate material reinforced with a non-woven grid of high-strength cord has been developed by the Griffolyn Division of Reef Industries. The material, called TX1200, is designed to be a lightweight, non-tear, protective covering for storing or shipping equipment.

Write in 985 on Reader Service Card

Electronic equipment shelters

Rohn Products is offering strong fiberglass shelters designed for railway use to house and protect sophisticated electronic equipment from rodents, insects, dust, and rain. Standard features include heavy galvanized-steel skid, lifting lugs for easy transportation, heavy aluminum/steel entrance door, and insulation. Optional features include a complete environmental control system, turnkey installation, exterior finishes, bulletproof siding, and choice of colors.

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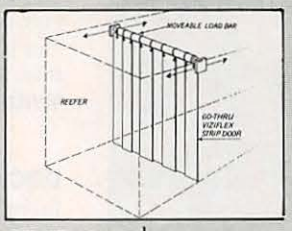
Cold-air preserver for reefers

A new vinyl-strip door available from Go-Thru Doors, Inc., is designed to be mounted on an adjustable load bar and positioned within a reefer trailer or car to conserve refrigeration in the loaded portion of the reefer. The doors can also be installed in refrigerated warehouses to reduce cold air loss when outer doors are opened.



Write in 987 on Reader Service Card

Low-cost radio equipment

TAD America Corp.'s "Track II" line of portable and mobile radios is claimed to be the lowest priced on the market by "breaking the $300 list price barrier." The radios are available in five-watt, six-channel VHF and UHF portables; or 25- to 35-watt, two-channel VHF and UHF mobiles.

Write in 988 on Reader Service Card

Shipper software

Bell & Howell's TRANS-PORT product line includes software developed by Transportation Concepts and Services (T.C.S.) that can automatically determine total freight charges and document freight shipment history. The COMPU-RATE IV system can be used on the IBM PC or the Apple-IIe. After inserting the proper diskette for the point of origin, the user enters Zip Code destination, product classification, weight, applicable "percentage of class," and applicable discount percent. The system then calculates and displays the total shipment charges. Other tariff control functions performed include adding freight charges to invoices, estimating inbound freight purchases, selecting shipping mode, forecasting, freight auditing, and freight consolidation analysis. A "Freight Shipment History" module keeps records of each shipment transaction.

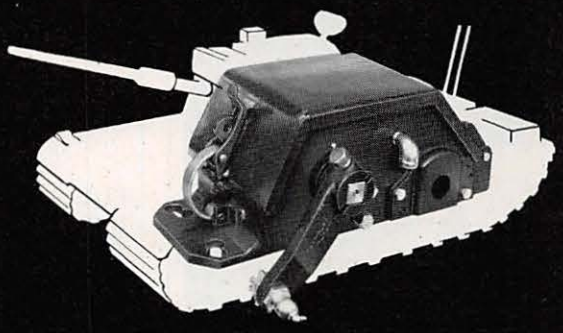
Write in 989 on Reader Service Card

Halogen emergency lantern

Apollo Manufacturing Inc. has developed a high-powered, sealed beam halogen lantern designed for operation with a DURACELL ID9030 industrial alkaline battery. The HB-30 halogen emergency lantern is said to be half the weight and size of emergency lanterns commonly used by railroads. The lamp's brilliant white beam provides a clear, well-lit work area.

Write in 990 on Reader Service Card

Built Like A Tank!



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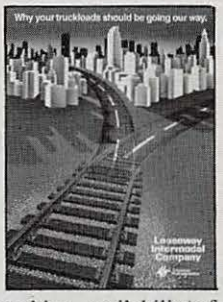
Literature

FULL-SERVICE INTERMODAL TRANSPORTATION. A new, four-color brochure from Leaseway Transportation Corp. describes the services of Leaseway Intermodal Co., including 24-hour centralized dispatching, availability of new 45-foot-long trailers set on 96-inch axles for use at any rail piggyback ramp, and constant monitoring of loads. It explains the company's positive confirmation policy, which includes four-hour cycle tracing during the rail portion of the trip and requires truck drivers to call and confirm every step of pickup and delivery during the over-the-road portion.



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TRACK INSPECTION. Rexnord's Railway Equipment Division has released an updated brochure on the Nordberg Trak-Inspector, a lightweight unit designed to provide accurate track gauge and cross-level readings at speeds up to 10 mph. The brochure also features the new optional recorder, which provides graphic records of inspection results.

Write in 992 on Reader Service Card

RUBBER GRADE CROSSINGS. A brochure from OMNI Rubber Products, Inc. (a subsidiary of Riedel International), describes the company's shimless rubber railroad crossing panels, which are fastened directly to the ties with high-strength Camrail timber screws. The brochure explains how the panels can be custom-trimmed to any grade crossing track configuration, and it provides complete installation instructions.

Write in 993 on Reader Service Card

TODAY'S RAILROADS. A new, 20-minute audio-visual production from the Railway Progress Institute takes the viewers on an imaginary cross-country train trip, with an inside look at the high technology used on today's railroads. "America's Railroads: As New as Today" is available in ¾-inch or ½-inch videotape or as a two-projector, 35-mm slide show. It can be either borrowed from the RPI or purchased.

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DOCK SEALS. A three-piece literature packet from AirLocke Dock Seal Division of O'Neal Tarpaulin Co. describes the company's line of truck and railroad dock seals. The set includes a general brochure on inflatable dock seals, an engineers' research report documenting results of a heat-loss study of industrial plants, and a selector guide for AirLocke products.

Write in 995 on Reader Service Card

COILS AND MOTOR REBUILDING. Swiger Coil Systems, Inc., is offering a brochure describing its capabilities in supplying coils and rewind kits for traction equipment and in rebuilding motor equipment for both locomotives and transit vehicles, as well as other industrial applications. The brochure focuses on the services of the company's international subsidiary, Swiger Coil International, Inc.

Write in 996 on Reader Service Card

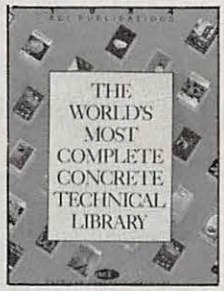
ADJUSTABLE CAPS WITH EMBLEMS. Cardinal Cap & Jacket Co. is offering a brochure describing its selection of adjustable caps with personalized emblems—intended to boost employee morale and give a company recognition. The brochure illustrates the range of styles and colors available.

Write in 997 on Reader Service Card

CONTROL OF CARBON SPARKS. Ferrous Corp. is offering a technical bulletin providing an analysis of right-of-way fires and how the company's FE6 fuel catalyst can help reduce them. Test results from the Burlington Northern Railroad and fire data from the state of Washington for the 1969-1980 period are presented.

Write in 998 on Reader Service Card

CORED COMPOSITE MATERIALS. Sandwich composite structures for railcar walls, floors and other applications are described in a new brochure from Baltek Corp. The brochure focuses on the benefits of balsa wood cores, and it illustrates examples of composite applications, including the Glasshopper II and Santa Fe's Fuel Foiler intermodal container.



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MAINTENANCE PAINTING SERVICES. DuPont Co.'s Finishes & Fabricated Products Department is offering a brochure explaining its Maintenance Painting Service (MPS), a program of regular maintenance painting for large manufacturers and processing companies.

Write in 1000 on Reader Service Card

CONCRETE TECHNOLOGY. A catalog of publications from the American Concrete Institute lists over 200 items on concrete technology, structural design, concrete materials and concrete construction. The catalog lists all ACI standards, codes and specifications.

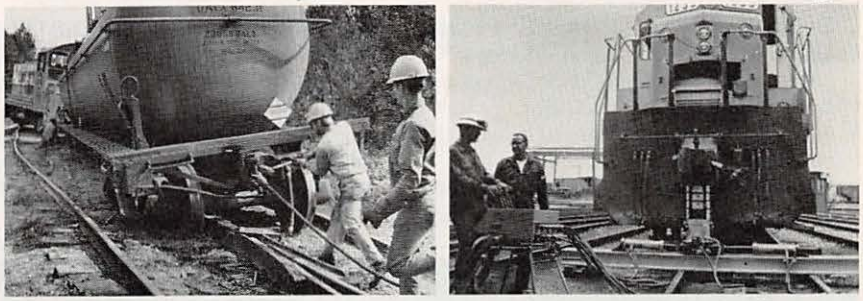
Write in 1001 on Reader Service Card

TOXIC & HAZARDOUS SUBSTANCES GUIDES. J.J. Keller & Associates, Inc., is offering a series of guides to dealing with EPA, OSHA and DOT regulations concerning toxic and hazardous substances. The series is a seven-volume set of reference guides, including a hazardous materials guide, a toxic substances control guide, a pesticides guide, an occupational exposure guide, a hazardous waste management guide, a hazardous waste services directory, and a hazardous waste regulatory guide.

Write in 1002 on Reader Service Card

RERAILING

the OLD way vs. the HOESCH way.



Hoesch hydraulic rerailing is fast and economical!

Lightweight, aluminum alloy Hoesch rerailing equipment prevents further damage to rolling stock or track and eliminates need for a pulling locomotive or crane. Derailed units can be easily moved with optional beams, roller carriages, and jacks. Hoesch hydraulic equipment offers universal railroad applications as well. It can be used in repair work, line of road work, and can assist B & B. Can any other single piece of equipment offer as much? Write or call today for complete information.

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With TRW, you're on the right track.

TRW has a line of engine valves, valve train components and remanufactured parts for railroad engines. It's no ordinary line — but a quality line to meet the special needs of big engine operations.

Take TRW valves, for example. TRW uses specially processed steels and other raw materials. Then we use a heat treating process developed for these materials and put the finished valves through the most rugged inspection you can imagine. The result for you: higher strength and better wear resistance.

For over 50 years (since we were known as Thompson Products), TRW has been perfecting the design and manufacture of engine parts. For more information, contact Heavy Duty Parts/Industrial Products, TRW Automotive Aftermarket Group, 719 S. Maple Avenue, Montebello CA 90640. Telephone 213.722.6470.

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Valves / Guides / Seat Inserts / Re-profiled Axle Gears / Re-sleeved Air Compressor Cylinders / Remanufactured Valve Bridges / Lash Adjusters / Remanufactured Turbo Screens

TRW

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Write in 28 on Reader Service Card

Write in 54 on Reader Service Card

Literature

BUILDING MAINTENANCE PRODUCTS. Randustrial Corp. is offering a 32-page catalog describing over 50 roofing, flooring and general maintenance products for industrial, institutional and commercial buildings.
Write in 1003 on Reader Service Card

TRANSPORTATION AND DISTRIBUTION BOOKS. J.J. Keller & Associates, Inc., is offering a free catalog describing over 60 transportation- and distribution-related books that were selected from various publishers. The catalog features five categories: Managing with Knowledge; For Productive and Profitable Employees; Operating Under Re-Regulation; Dealing with Hazardous Wastes, Materials and Substances; and Information Sources for Executives.
Write in 1004 on Reader Service Card

NONFLAM®
could
save it.

Nonflam fire retardant protects timber decks and trestles from those fires created by railroading activity. And more than eighty percent of bridge fires are caused by hot brake shoes, brake shoe slag and carelessly thrown fusees.

Such a fire creates costly interruptions and detours... as well as the expense of replacement or repair—and liability loss.

Nonflam spray-on protection cuts these risks down to size. It's well worth writing us for the whole story.

OSMOSE RAILROAD DIVISION
P.O. Box 8276 • Madison, Wisconsin 53708
608/221-2292 • 800/356-5952
Write in 62 on Reader Service Card

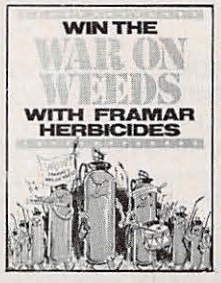
COLOR-BLINDNESS TESTING. A color-blindless test book containing 15 numercial plates in a loose-leaf vinyl binder is available from Richmond Products. The test is designed to accurately determine red-green vision deficiency. It can be obtained from Richmond Products, 4089 S. Rogers Circle, Boca Raton, FL 33431 for $53.85.

Write in 1005 on Reader Service Card

COATINGS INSPECTION. A full-color brochure available from KTA-Tator, Inc., stresses the importance of on-site coatings inspection to insure against premature failure and costly rework, and describes the company's services, including failure investigation, corrosion surveys, specification preparation and material selection.
Write in 1006 on Reader Service Card

IDENTIFICATION PRODUCTS. Panduit Corp. is offering a 28-page full-color catalog describing its complete line of INSTA-CODE identification products, including custom markers, wire marker books and cards, wire markers on tape, clip-on wire markers, and safety signs.
Write in 1007 on Reader Service Card

WEED KILLER CATALOG. Five different herbicides are described in a "War on Weeds" catalog from Framar Industrial Products, Inc. The weed killers are described as environmentally safe with long lasting control of up to one full year.



Write in 1008 on Reader Service Card

KONI DAMPERS, FOR HIGH SPEED SAFETY AND STABILITY.

KONI adjustable railway dampers are used and known throughout the world for reliability and extreme long life. They offer such exceptional damping that they allow higher running speeds with safety and exceptional stability.

The Yaw Damper—Another Koni Innovation.

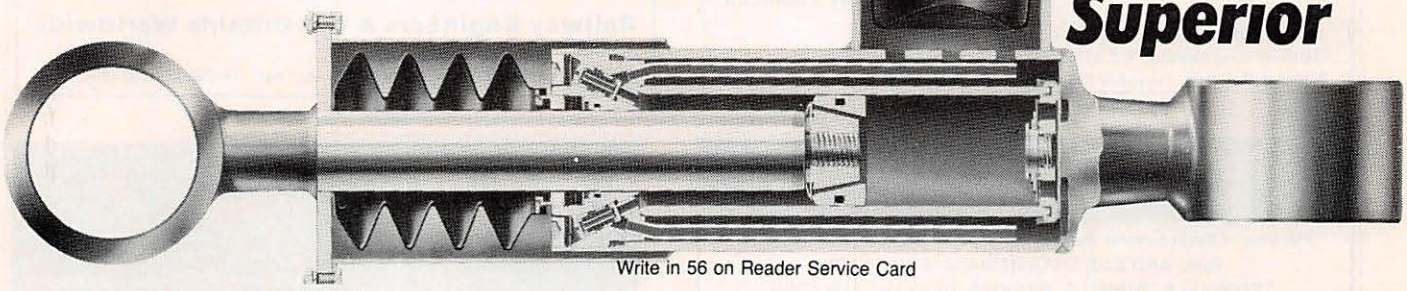
KONI's new yaw dampers are designed to control small amplitude sinusoidal rotational movements permitting extreme high speed operation while reducing wear on suspension components. KONI yaw dampers are fitted on the French TGV train which has been tested at 238 miles per hour.

And, like all KONI railway dampers, they can be adjusted to compensate for eventual wear. Adjustability plus KONI's proven ruggedness can withstand the high forces generated by the truck's movement, guaranteeing the longest life possible.

KONI dampers and yaw dampers can be designed for specific applications and can be fitted on virtually any rolling stock in the world.

For information on what KONI dampers can do for you, call or write: James Vance, Senior Sales Engineer, Koni America Inc., Dept. RR, PO Box 40, Culpeper, Va. 22701 Tel.: 800-336-2120.

KONI-Proven Superior



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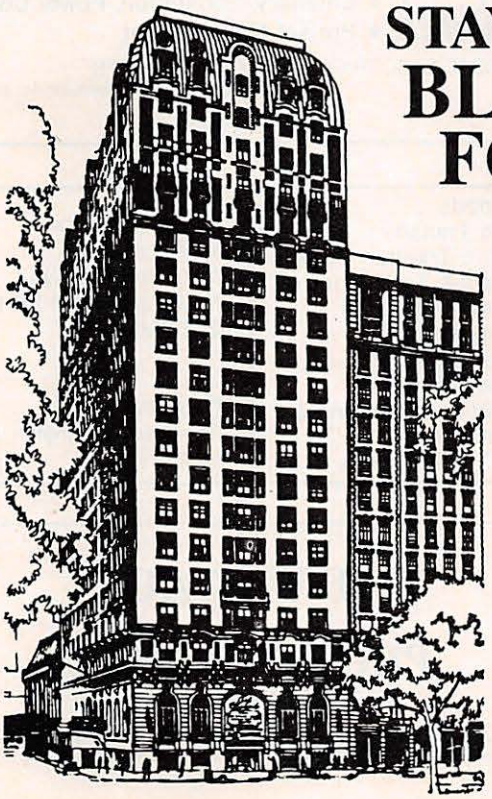

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RAILWAY AGE
PROFESSIONAL
BRINGS FAST ACTION

100 YEARS AGO IN

(August 1884)

Six years ago steel rails sold in this country at $172 per ton. Now they are quoted as low as $28. What a terrible burden a protective tariff is, to be sure!

* * *

The Union Pacific's line to Oregon and the Pacific coast at Portland is rapidly approaching completion. The Oregon Shore Line now lacks only 2½ miles of reaching Huntington, Oregon, a distance of 545 miles west of Granger, Wyo., the point at which it branches from the main line of the Union Pacific, and 1,417 miles from Omaha.

* * *

The regulation time for building the 33-foot standard box car used on the Baltimore & Ohio in the Mt. Clare shops of that company is ten hours. The work is done by nine men. One of the cars has been built by this number of men in nine hours.

* * *

An Indian boy at Acambaro, on the Mexican National road, asked an employe of the road how he could calculate the difference in diameter between the inside of a cylinder and its exterior. The boy was scarcely 16 years of age, and the railroad man was thunderstruck at a question he could not solve. Going with the boy to his hut he found that he had actually constructed two miniature engines. One of them was a stationary engine with an annex; the second was a tiny Baldwin engine, both in running order. The Mexican Edison had constructed the machines with a file and knife. The railroad man informed Mr. Gonzalez, who immediately took the boy and sent him to the Baldwin Locomotive Works in Philadelphia for a term of five years at his own cost to complete the education of the talents with which nature has so wonderfully endowed him.

* * *

The South-Eastern railway company of England is said to be building locmotives that will make the run from London to Folkestone, 71 miles, in less than one hour.

* * *

Only five miles of track and a few days of time are lacking to complete the "Huntington system" of railways entirely across the continent from the Atlantic to the Pacific. The Chesapeake & Ohio system now extends from Newport News, Va., to Memphis, Tenn., 1,120 miles, the Southern Pacific is in operation from New Orleans to San Francisco, 2,495 miles, and the intervening gap of 455 miles from Memphis to New Orleans is now nearly closed by the Louisville, New Orleans & Texas railway, under which name have been consolidated the Tennessee Southern railroad, New Orleans, Baton Rouge railroad, Vicksburg & Memphis railroad, and New Orleans & Mississippi Valley railroad. The total length of the line from Newport News to San Francisco is 4,070 miles—a prodigious distance to be covered by what is practically a single system. Mr. C.P. Huntington and his associates deserve honor for all time for successfully carrying through an enterprise of such magnitude, and one of such vast benefit to the country.

* * *

Track laying on the Canadian Pacific railway has reached a point 7 miles west from the summit of the Rocky mountains, and there is some hope of reaching the summit of the Selkirk range, 25 miles farther west, before winter.

* * *

Paris is about to have a metropolitan railway, which, if the plans be approved by the chambers, will be partially in tunnel and partially in cutting. The question of taking the line under the Seine has been discussed. The termini of the line will be at St. Cloud and the Bastile. From St. Cloud to the Arc de Triomphe the route would be entirely daylight. After leaving the Arc de Triomphe, the railway would go underground and be entirely subterranean for the greater part of the distance to the Bastile.

* * *

The announcement is made that the Chicago & North-Western railway company is about to let contracts for extending the Sioux City & Pacific to a point 89 miles west of Valentine, Neb., the present terminus of the latter road. It is understood that both the Black Hills and Denver, Colorado, or the eastern terminus of the Central Pacific are the objective points of this extension.

How to Start a Right-of-Way Fire.

Use carbon sparks! This handy demonstration kit makes plenty.

It includes a locomotive stack simulator, carefully selected pieces of hydrocarbon and complete operating instructions.

Each kit also explains how sparks from locomotives—even turbo-charged units—can cause right-of-way fires and how Ferrous FE6 can prevent them.

Seriously, we don't suggest that you use this kit to start a right-of-way fire. But you can use it as a first rate charcoal starter for your barbecue. One piece of newspaper is all it takes, and the mesquite charcoal enclosed with the kit can turn basic barbecue into a gourmet feast.

Use the kit's valuable information to prevent roasting your right-of-ways this summer and use the kit to help barbecue a few burgers or steaks.

ACT NOW WHILE SUPPLIES LAST

Use the handy coupon to order your complete kit. If you don't want the kit, simply circle the reader service number for free information on how to prevent fires by using Ferrous FE6 Combustion Catalyst.

☐ Please send _____ Ferrous Right-of-Way Fire Demonstration Kit(s) at $14.95 each. My check is enclosed.

☐ I would like one of your sales representatives to deliver my kit personally.

Name _____

Title _____

Company _____

Street Address _____

City/State/Zip _____

Phone _____

Please clip and mail to Al Vinson at:

Ferrous Corporation
910-108th Ave. N.E.
P.O. Box 1764 Bellevue, WA 98009

ferrous

FERROUS HAS THE PROOF

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Classified

Standard Classified: Classified advertising is sold in full-inch multiples. Column width is 3⅜". One column inch equals approximately 70 words, seven lines per inch,including headline and address. For display classified requiring illustrations or logotypes, camera-ready art or film must be provided. Advertisers who wish to use a box number must provide complete information where returns can be mailed. Box numbers are provided at minimal cost (see Rates).

Rates: Classified advertising is $65 per column inch. Classified advertisements exceeding dimensions of ¼ page are charged at nearest display rate. For box numbers, add $10 per insertion. Prices are net, non-commissionable. Full payment must accompany all orders.

Closing Date: 5th of month preceding cover date. (Example: December issue closes November 5.)

Send To: Classified Advertising, Railway Age, 345 Hudson Street, New York, NY 10014. Or call Connie Lubrano, (212) 620-7253.

REPRESENTATIVES WANTED

Leading manufacturer of prefabricated, modular insulated shelters for equipment and personnel, seeks representatives to call on telephone, TV, microwave relay, power distribution, railroads, and other utilities.

Reply to: Ms. Pat Freese
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Major multi-billion dollar construction project based out of NYC. Will be responsible for total project management and will represent owners with contractors and subcontractors. Typical project size in excess of 50M. Must have proven communication and management responsibilities. Excellent compensation package including 4 weeks paid vacation. PE desirable but not necessary. EOE. Send resume and salary history in strict confidence to:

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ENGINEERS

A challenging opportunity exists for qualified individuals in the Port Authority's Rail Transportation Department, which is presently engaged in a Rail Car Acquisition Program, Car Rehabilitation Program, New Car Shop, Running Repair Shop, Ventilation Program, Structural Integrity Program, Electrical Improvement Program and Station Improvement Program for PATH.

We are seeking Engineers at various levels of experience who have attained at least a Bachelor's Degree in Engineering and who possess good written and oral communication skills.

1.3/1.11x35.3 Senior Engineer positions require a mimimum of seven (7) years design or planning experience and demonstrated supervisory skills for planning projects. Positions also available for Staff Services Engineers and Rail Planning Engineers with a minimum of five (5) years experience in the Planning and Operations area.

Interested persons meeting the criteria outlined above should send detailed resume (including salary history) to:

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AN EQUAL OPPORTUNITY EMPLOYER

Wanted - SALES REPRESENTATIVE

National firm engaged in the sale of locomotives and component parts and complete rebuilding of same is seeking experienced sales professionals for the northeast and southeast United States.

Ideal candidate will have a minimum of five years experience in railroad or railroad related sales. Position requires an aggressive "self-starter" able to handle additional responsibility as company growth continues.

Position offers competitive compensation package including benefit package, company car, and paid expenses. REPLY TO **RA #188,** Railway Age, 345 Hudson Street, New York, New York 10014.

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Professional Engineer (M.E., MBA) Located in Phila. Suburb interested in representing suppliers to the Mass Transit/Railroad Industries. Over 10 yrs Engineering experience in Transit Vehicle Design and Maintenance Management Systems. Reply to **P.O. Box 276 Lafayette Hill, Pa. 19444.**

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Established company wants an outside salesman who has 2 to 5 years experience selling Rail and Track Accessories. Position is located in the Southwest. Reply to:

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PROJECT ENGINEER

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Attn: W.M. Stout Attn: D.G. Stout

STATE OF CONNECTICUT
CONNECTICUT DEPARTMENT OF TRANSPORTATION

Connecticut's Department of Transportation has openings for experienced rail managers. Positions require a minimum of 3-10 years experience in rail management, specifically in transportation, mechanical (electrified experience would be a plus), maintenance of way (bridges in particular), systems, planning and budgeting. A degree is desirable, but relevant experience would be considered in lieu of.

Reply to William A. Lazarek, Deputy Commissioner, Connecticut Department of Transportation, 24 Walcott Hill Road, Wethersfield, Connecticut, 06901. *All responses will be held in strictest confidence. An equal opportunity employer, M/F.*

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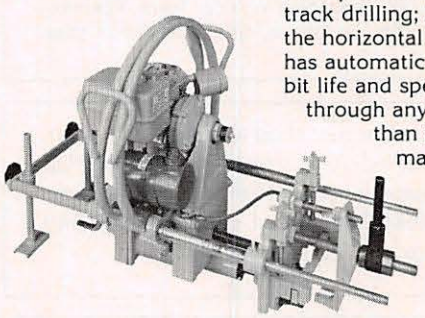

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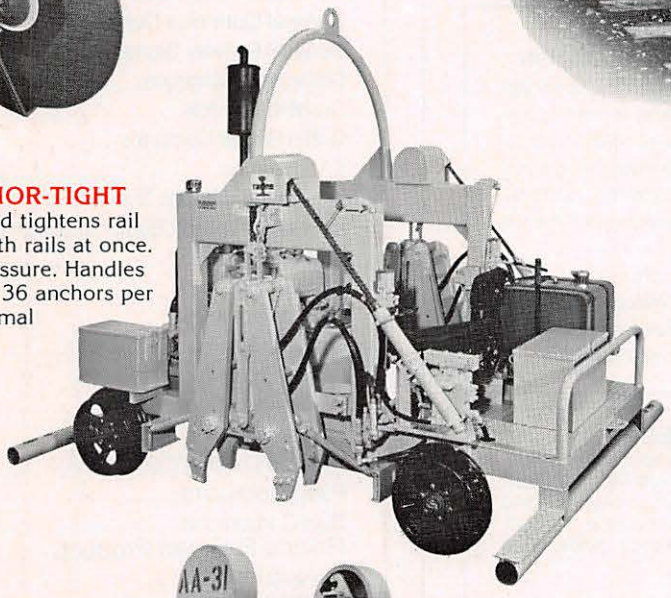


DUAL-ANCHOR-TIGHT

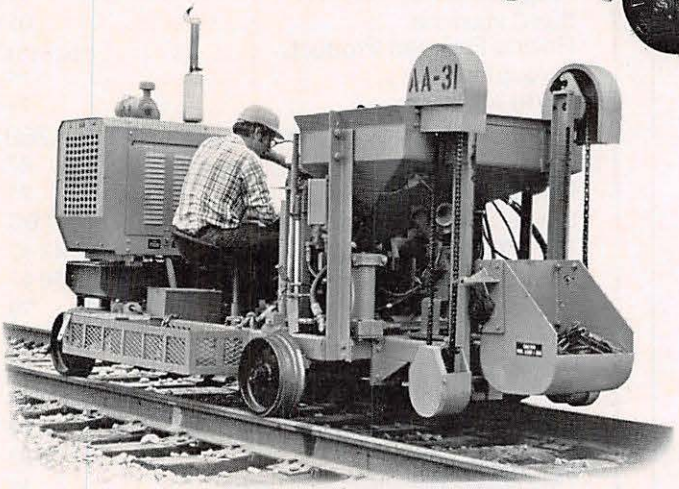
Repositions and tightens rail anchors on both rails at once. Adjustable pressure. Handles up to 9 ties or 36 anchors per minute on normal quarter-mile welded rail.

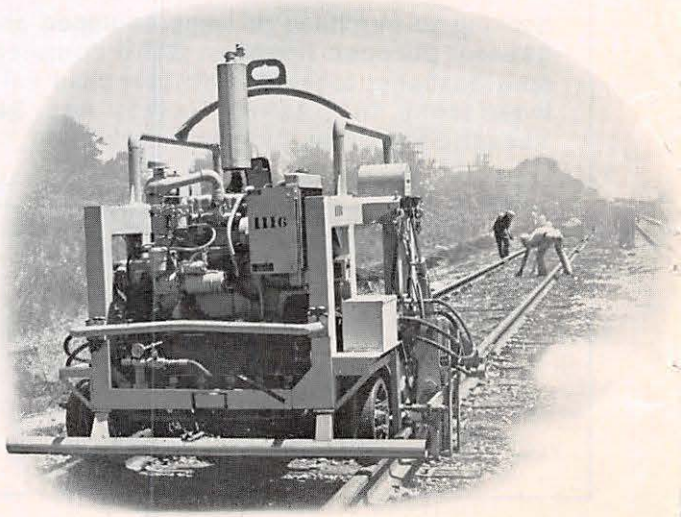
REGAUGE-ADZER

This high-quality, heavy-duty machine makes adzing wooden ties for regauging track quick and easy. Adjustable cuts in just 5 seconds. 6-hp engine and 6-gallon tank allow 12 continuous hours of operation between fill-ups.

DUAL-ANCHOR-FAST

Dual nipper heads speed up anchoring and boxing operations, applying up to 36 anchors per minute. Diesel or gasoline engine option. Can be removed from track in minutes.

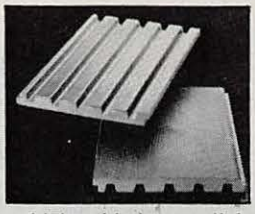




ANCHOR-MATIC

One of our largest, Anchor-Matic pre-sets and applies rail anchors. Operator places hopper-fed anchors on a feeder rack, then automatic cycling positions and applies the anchors on the base of the rail with positive hydraulic pressure.

Composite trailer flooring



Centrite, a new fiberglass/foam composite developed by Center Corp. and being marketed by The Budd Co. for use in trailer flooring, is said to have equalled or surpassed hardwood laminates in every property tested. A Centrite board is 12 inches wide by 1/4 inches thick, with five parallel, 5/8-inch-deep convolutions along the bottom which are designed to reduce weight (to 10% below the weight of laminated hardwood) and increase the surface skin area to provide greater stiffness and load-bearing capacity. Like wooden flooring, Centrite can be nailed, but unlike hardwood laminates, says Budd, the new material is impervious to all moisture and acids, has long life fatigue properties and uniform quality, and is readily available in boards of varying lengths.

Write in 972 on Reader Service Card

Air/water transfer hose

Dayco Corp.'s new Railroad Air/Water Hose Series 7154 was developed to meet AAR standards M-604 and M-608 for pneumatic air tool and cold water hose usage. The hose is made of a tube and cover of black EPDM and a reinforcement of two or three textile braids, depending on size; sizes range from 1/4 to 1 1/4 inches, and maximum recommended working pressure ranges from 150 to 200 psi.

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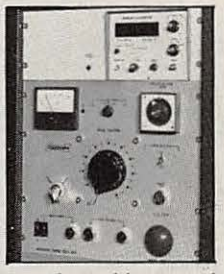
Multi-test rotating-machine evaluation



Hipotronics, Inc., has developed a rotating machine surge tester that evaluates large motor windings and insulation systems in large rotating apparatuses. The unit, designated Model RST-75, is a single-stage impulse generator with variable waveshaping network, controls, charging supply, and broadband voltage and monitoring probes to perform a variety of tests, including: Testing form wound coils prior to assembly; locating faults on damaged machines, and testing assembled machines. Typical applications include synchronous, AC industrial, and DC to AC machines used by rapid transit authorities, railroads, manufacturers, maintenance shops, and other users.

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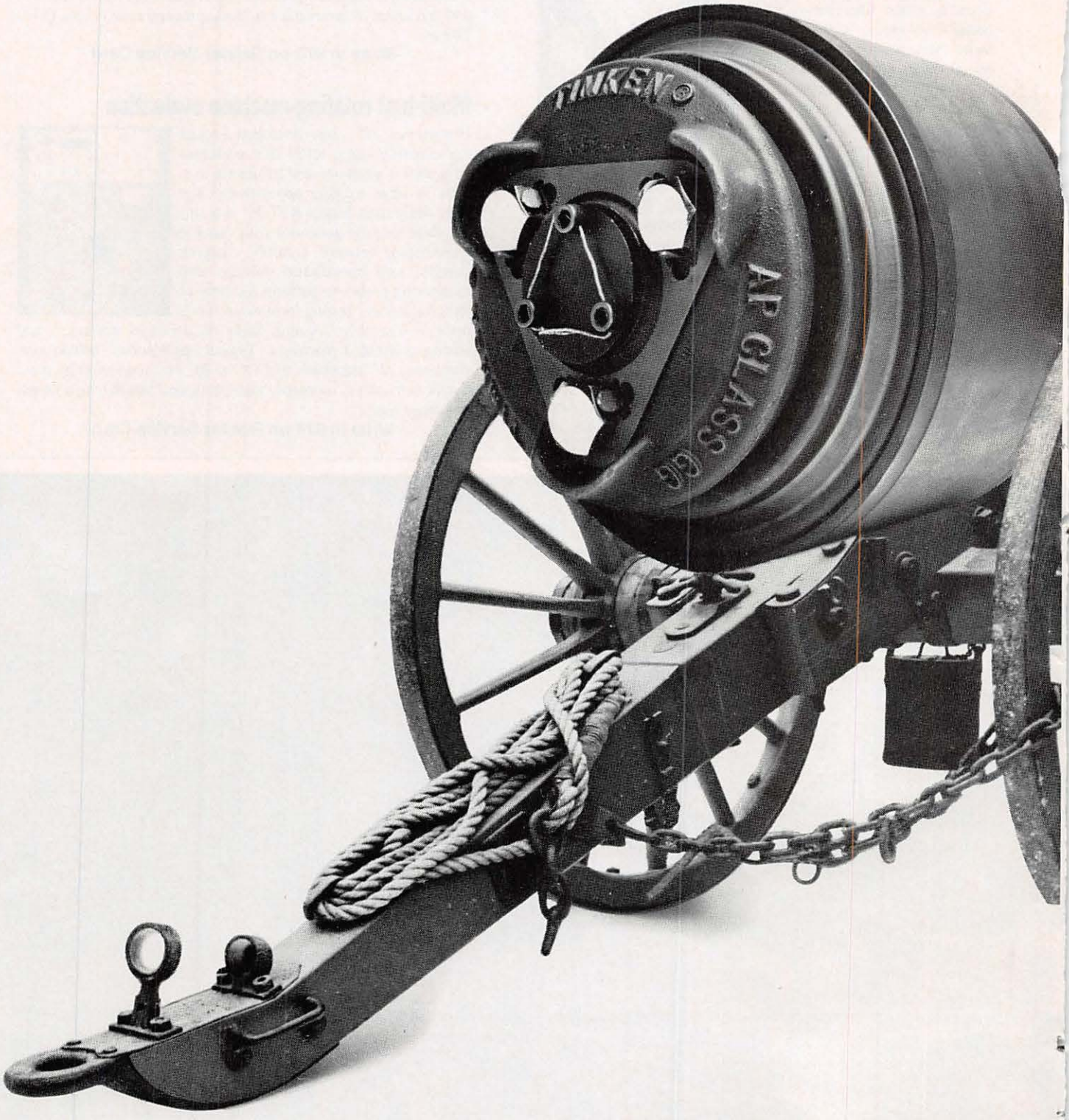
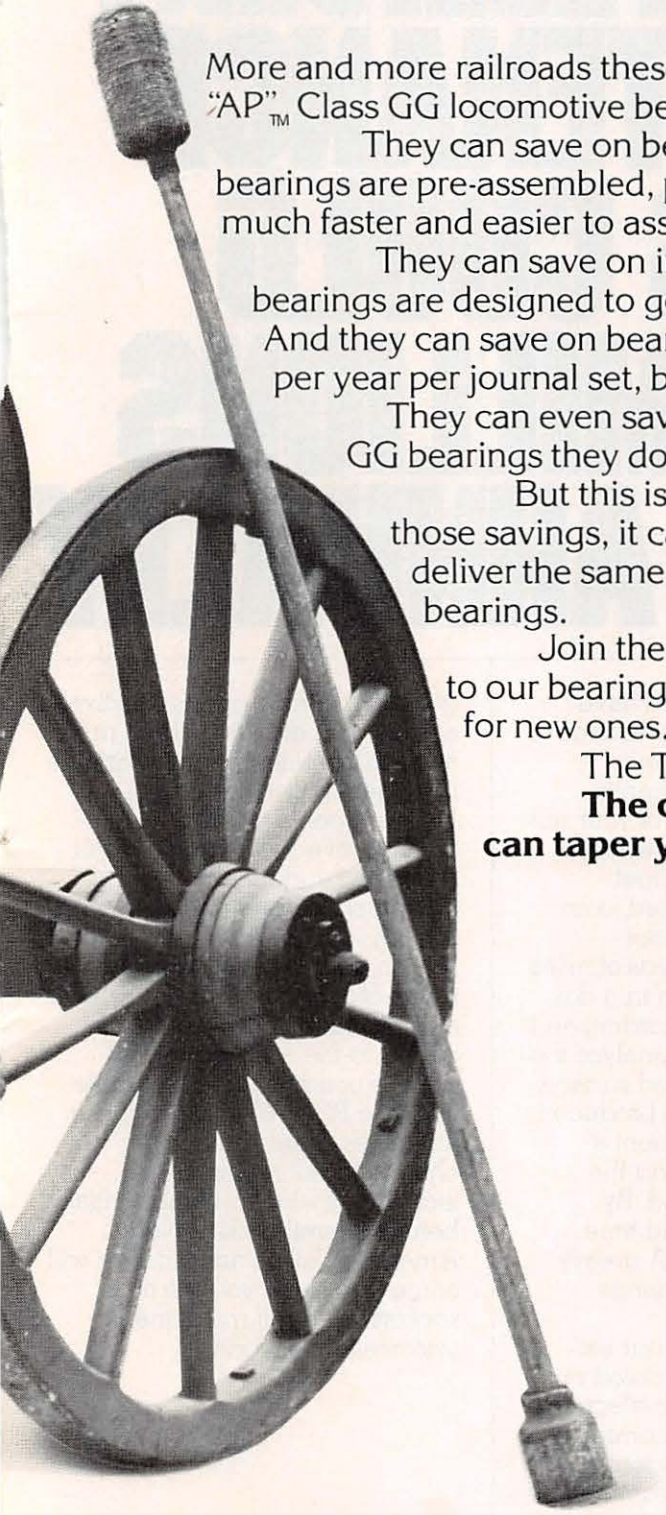


GOING ON IN



More and more railroads these days are taking a good, long look at Timken® "AP"™ Class GG locomotive bearings. Here's what they're discovering:

They can save on bearing installation because Timken Class GG bearings are pre-assembled, pre-set and pre-lubricated. That means they're much faster and easier to assemble than other types of locomotive bearings.

They can save on in-service maintenance because our Class GG bearings are designed to go up to 250,000 miles without relubrication.

And they can save on bearing remanufacturing costs—as much as $28 per year per journal set, based on average costs.

They can even save on parts inventory because with our Class GG bearings they don't have to stock housings for spare axle sets.

But this is the best part: While a railroad is counting up all those savings, it can also count on our locomotive bearings to deliver the same reliable performance as our other Timken "AP" bearings.

Join the Timken bearing revolution now by changing to our bearings on existing locomotives—and specifying them for new ones. In this revolution, everybody wins.

The Timken Company, Canton, Ohio 44706.

The company that tapered the bearing can taper your bearings costs.

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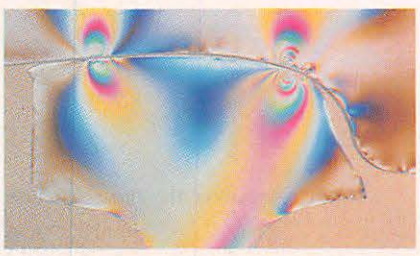
Each year the railroads of America spend around 650 million dollars on replacing rail. Not all of this rail will have reached its potential service life ... in fact, much of it will have failed several years earlier than necessary.

Why? Because, quite simply, it wasn't taken care of. Last year, for example, only 15 million dollars was spent on rail maintenance by grinding. If that figure had been doubled, rail replacement costs could well have been reduced by more than 50 million dollars ... that's a return on investment in the order of 300 percent.

As surprising as these figures are though, we appreciate that rail maintenance budgets are limited and, in many cases, insufficient to provide rail maintenance at a standard necessary to ensure maximum rail life.



Improper wheel/rail contact causes excessive contact stresses.

And that is why we have designed and built a new range of intelligent rail maintenance systems that will significantly improve the efficiency of your rail maintenance program, without raising your MOW budget.

RSA, a self-propelled, computer assisted Rail Surface Analyzer, maps hundreds of miles of rail surface condition in a day. It uses custom-built recording and computing facilities to analyze the condition of the rail head surface. A Rail Quality Index is produced, giving each track segment a numeric value indicating the severity of defects found. By producing accurate and time saving information, RSA greatly improves your maintenance planning.

RMS-1, the first of our self-propelled, computer assisted rail grinding systems, grinds effectively at four mph, and incorporates instantly variable Intelligent Pattern Selection, Programmable Obstacle Clearance, Active Longwave Control, Auto-load and many other advanced features designed to increase the speed, efficiency and cost effectiveness of rail grinding.

RMS-2, the second of our self-propelled, computer assisted, rail grinding systems, grinds effectively at speeds in excess of three mph, and incorporates instantly variable Intelligent Pattern selection, Programmable Obstacle Clearance, Active Longwave Control, Auto-load and many other advanced features similar to those proven in RMS-1.

In addition, our standard range of grinding systems can now also produce improved results, thanks to the accuracy of rail surface condition data available from the RSA. We believe these advances represent a major change in rail maintenance technology which will substantially benefit the railroads of North America. Call us now and we will come and show you the most sophisticated rail maintenance systems in the world.

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Over 1½ million Mark series gears have earned a #1 reputation for reliability with railroads, private car owners and utilities nationwide. Under all extremes of service. But the day will come when they could use some fresh new components. And that's a happy day, because the low cost of putting a Mark gear back in shape is the best bargain in the business.

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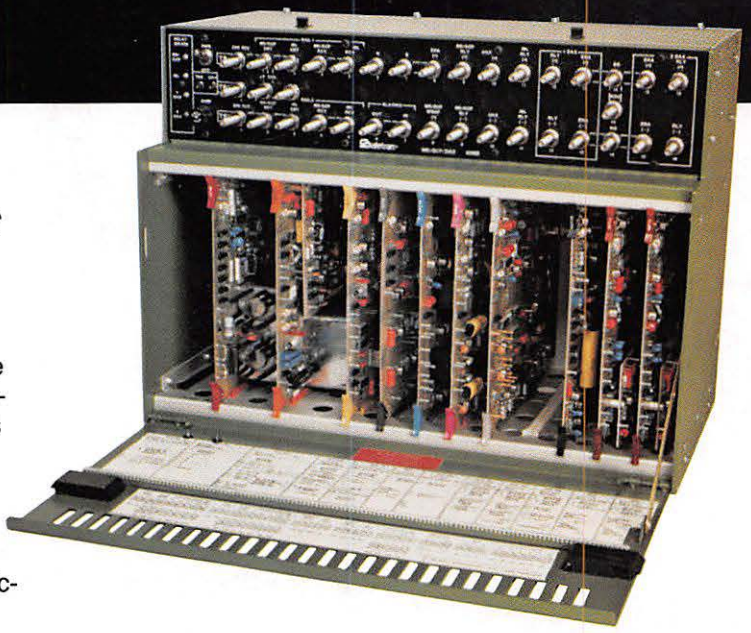

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14,414 grade crossing predictors have been delivered since the first Model 200 was installed in 1963. Control system technology has come a long way since then, with Safetran grade crossing predictors now featuring advanced solid state electronic circuits which allow unidirectional or bidirectional operation, DAX adjacent crossing prediction, traffic signal preemption, variable warning time, and other programmable options.

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Whether your need is for mechanical components, solid state crossing warning devices, or the design and installation of an entire warning system, Safetran's record for performance remains unequalled.

Safetran meets the challenge.

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